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India Early Childhood Education Impact Study

The India Early Childhood Education Impact Study

Ambedkar University, Delhi

CECED
CENTRE FOR EARLY CHILDHOOD EDUCATION AND DEVELOPMENT

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Evidence for Action

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The India Early Childhood Education Impact Study

Authors

CECED, Ambedkar University Delhi:
Venita Kaul and Aparajita Bhargarh Chaudhary

ASER Centre:
Suman Bhattacharjea, Purnima Ramanujan, Manjistha Banerji and Mansi Nanda

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ABS	Adaptive Behaviour Scale
CECED	Centre for Early Childhood Education and Development
ECCE	Early Childhood Care and Education
ECD	Early Childhood Development
ECE	Early Childhood Education
ECEQAS	Early Childhood Education Quality Assessment Scale
ECEQAS Plus	Early Childhood Education Quality Assessment Scale Plus
EFA	Education for All
EGA	Early Grade Assessment
FE	Fixed Effects
ICDS	Integrated Child Development Services
LKG	Lower Kindergarten
NGO	Non-Governmental Organization
OBC	Other Backward Class
OLS	Ordinary Least Squares
RTE Act	Right of Children to Free and Compulsory Education Act
SC	Scheduled Caste
ST	Scheduled Tribe
SRI	School Readiness Instrument
SRS	School Readiness Scores
UKG	Upper Kindergarten
UNICEF	United Nations Children's Fund

Overview

If we could take a snapshot of all four-year-olds in India at, say, 11 a.m. across the entire country, where would we find them and what would they be doing?

Given that these are very young children, there are only a few likely options. They could be at home, with parents and siblings, perhaps with other family members. They could be in a government preschool facility known as an Anganwadi ("courtyard centre"), spending a few hours with other young children from their neighbourhood in a relatively unstructured environment. Or they could be in a formal early childhood education facility that offers a structured educational curriculum intended to help young children prepare for primary school.

But the fact is that we really don't know the answer to this question. Nor do we have answers for other questions that follow this one, such as – which children fall into each of these categories? What kinds of inputs and support do they get in each case? How does this experience influence their social, cognitive, and emotional outcomes as they grow older? What factors generate the best outcomes?

The reason these questions matter is because international research over the past half century demonstrates conclusively that early childhood is a critical period, in fact the single most important period in human development. The environment, inputs and support that children receive in their first eight years will have an enormous impact on the rest of their lives – not only in terms of their performance in school, but on a wide range of other outcomes that extend far beyond school. Investments in high quality interventions for young children are therefore thought to be cost effective ways of improving outcomes both for individual children, especially in the case of vulnerable or disadvantaged children, and for society as a whole.

In recent years India has made significant progress with respect to strengthening the policy framework for early childhood. The Government of India released the National Early Childhood Care and Education (ECCE) Policy in 2013, and subsequently a National Curriculum Framework and Quality Standards. Together, these documents provide a comprehensive framework for promoting access, equity and quality in ECCE. State governments have designed their own curricula in the light of this national framework.

However, in order to achieve a goal, we need to identify not only the goal itself, but also the starting point. Achievement of the objectives and standards laid out at the policy level requires a comprehensive understanding of what our young children are doing today and the ways in which these early trajectories influence their subsequent development. The objective of the India Early Childhood Education Impact (IECEI) Study is to contribute to this understanding.

IECEI Study is perhaps a path breaking study in India in several respects.

First, it is a longitudinal study, meaning that it followed a cohort of children over time – in this case over a period of 4 years, from age 4 to age 8, during which it collected information from learning assessments

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at five different points in time, one year apart. The study also carried out an annual observation based assessment of the quality of early education children experienced over the four years. Tracking what individual children did and what they learned over time enables us to identify the causes of observed changes in learning outcomes with some confidence.

Second, the study covered a large sample of children (about 14,000 during the first round of fieldwork) from three very different states of the country: Assam, Rajasthan and Telangana (erstwhile Andhra Pradesh), thus providing evidence of differences and commonalities in what young children do across these different contexts.

Third, it was designed to provide scale as well as depth. Villages were randomly sampled in each of the 6 districts included in the study (two districts per state). In 306 of these villages, 4-year-old children were randomly sampled, enabling us to generate estimates of participation and learning that are representative at the district level. In 75 villages, 4-year-old children were purposively sampled and followed much more closely, in order to gain a comprehensive and in-depth understanding of the quality of the institutions they attended and the social and cognitive outcomes they achieved. Some programmes considered to be innovative were also included in the sample to ensure variance in quality.

And fourth, it is a mixed-methods study. While the largest fraction of data collection employed survey methodology, a significant proportion involved the use of comprehensive observation tools to collect detailed information on the quality of preschool and school facilities, staff and processes. In addition, case studies and qualitative interviews at different points during the study provide a rich and layered understanding of some key ingredients of a good quality preschool, how parents think about what their young children should be doing and the decisions they take with respect to their children's education.

About this report

This report pulls together the major findings drawn from different components of the IECEI Study, which was in the field from late 2011 to late 2015.

Chapter 1 sets out the context for the study. It summarizes the international research on young children and the evidence from various disciplines regarding the importance of early years for children's subsequent development. It explores the concept of 'school readiness' and describes the context in India in terms of policy, existing programmes, and previous research.

Given this context, **Chapter 2** introduces the IECEI Study, its objectives, design, methodology, and sample.

Chapter 3 provides a glimpse into key demand and supply factors with respect to preschools in sampled villages. This chapter lays out the "provisioning landscape" - the availability of preschool facilities for young children in sampled villages - as well as parents' opinions regarding the kinds of facilities they want for their children.

What kinds of preschools or schools did sampled children actually attend between age 4 and age 8? **Chapter 4** looks at children's participation in preschools and schools, both over time and across states, as well as the relationship between participation trends and children's individual and household characteristics.

How do the different models for early childhood education available to children vary in terms of quality indicators? **Chapter 5** discusses key aspects of and variations in programme quality across different preschool and school service providers as well as how these differences result in varied experiences for children.

Chapter 6 brings together the analyses from previous chapters to examine the impact of varied participation trajectories as well as quality variations in programmes on children's school readiness. **Chapter 7** extends this analysis, exploring whether and how higher levels of school readiness improve children's learning outcomes in the early grades of primary school.

Finally, **Chapter 8** pulls together key conclusions from earlier chapters of the report along with a set of emerging recommendations for policy and practice.

About the core research team

The IECEI Study was designed and led by the Centre for Early Childhood Education Development (CECED) at Ambedkar University, Delhi, and ASER Centre, New Delhi, in collaboration with UNICEF.

CECED was established as a constituent of Ambedkar University, Delhi in 2009 to promote research, advocacy and quality in the field of early childhood education and development. Its mission is to contribute towards the national goals of social justice and equity by promoting developmentally and contextually appropriate ECCE as every child's right to a sound foundation and raising ECCE in the forefront of policy formulation and effective universal programme implementation.

ASER Centre is the research and assessment unit of Pratham Education Foundation. Best known for facilitating the national survey of children's foundational learning known as the Annual Status of Education Report, ASER Centre also conducts research on different aspects of the education system as well as other social sectors, focusing on generating actionable evidence related to children's learning.

Acknowledgements

We would like to thank members of the Research Advisory Committee and the Coordination Committee for their continued involvement, interaction and advice over the course of the study: Prof. T. Saraswathi (Chair), Ms. Mina Swaminathan, Prof. A. B. L. Srivastava, Dr. Nandita Chaudhary, Dr. Deepa Sankar, Dr. Sridhar, Prof. Chandan Mukherjee and Dr. Surajit Das. Special thanks to Prof. Hiro Yoshikawa for reviewing the research and providing invaluable inputs.

We also thank Ms. K. Lakshmi and her team at the Andhra Mahila Sabha, Hyderabad and Dr. B. Bhuyan and her team at the National Institute for Public Cooperation and Child Development (NIPCCD), Guwahati, who were responsible for

implementing the study with the smaller sample of children in Telangana and Assam respectively. For the Rajasthan field work CECED's own teams of researchers relocated frequently for long spells to the Rajasthan villages thus making an invaluable contribution to this research. A community of well-known Indian researchers led by Dr. Monimalika Day from CECED came together to carry out the case studies. The invaluable contribution of all these organizations and individuals is gratefully acknowledged (Appendix 1.1).

Ravi Kumar Lingam, Dharm Pal Jat and Pranab Baruah ably led ASER Centre field teams in Telangana, Rajasthan and Assam respectively.

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Chapter 1

Why focus on early childhood?

1.1 Introduction

Early childhood is defined as the period from birth to eight years of age, a period of rapid development of the brain and the years in which lifelong development of the child is rooted.[1] The concept of ECCE encompasses the set of inputs and processes that young children need to ensure their later social, emotional, and cognitive development, which include health, nutrition, care, and opportunities for early learning. In the words of UNESCO, *"early childhood care and education is more than a preparatory stage assisting the child's transition to formal schooling. It places emphasis on developing the whole child - attending to his or her social, emotional, cognitive and physical needs - to establish a solid and broad foundation for lifelong learning and wellbeing"*.[2] Located in an integrated and holistic paradigm, the concept of ECCE follows a life-cycle approach[3] and covers the entire childhood continuum, from the prenatal stage to eight years of age.

In recent years ECCE has emerged as an area of high priority at the international level. To quote from the former UN Secretary-General, Ban Ki-Moon's speech at the Forum on Investing in Early Childhood Development (ECD) in September 2015, "*For the first time, the global development agenda includes a target for early childhood development. The Sustainable Development Goals recognize that early childhood development can help drive the transformation we hope to achieve over the next 15 years.*" ECD or ECCE, both interchangeable terms, has been included as a specific target in the context of Goal 4 of the Sustainable Development Goals for 2030, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Target 4.2 states, "By

[1] Earlier definitions of ECCE covered children up to 6 years of age. Although India continues to adhere to this definition, internationally the concept of ECCE has been extended to eight years due to the realization of the need to ensure a smooth transition for children at the time of entry into school, given the fact that children are still very young at that stage and have developmental characteristics similar to preschoolers, along the early learning continuum.

[2] UNESCO website, http://en.unesco.org/themes/early-childhood-care-and-education. Retrieved on 5 February 2017

[3] Life cycle approach refers to the need to address the entire cycle or continuum of child's development, starting from adolescent girls as potential mothers to pregnant women, lactating mothers, infancy and early childhood.

2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education" (UN, 2015). India is among the 193 countries that have endorsed the Sustainable Development Goals (SDGs) and committed to working towards their achievement (Niti Aayog, 2016).

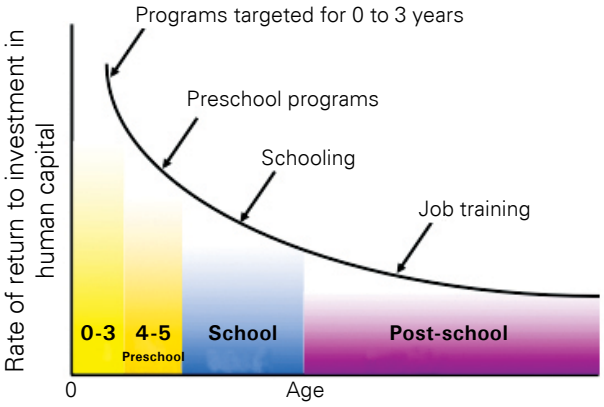
1.2 What's the evidence that early childhood is a critical period?

The priority given to ECCE at the level of international policy is an outcome of widespread advocacy over the years, based on a growing body of multidisciplinary research which demonstrates a range of benefits that accrue from intervening early to provide appropriate support and care to young children. These include social and economic benefits, better child wellbeing and learning levels as a foundation for lifelong learning, more equitable outcomes and reduction of poverty, and increased inter-generational social mobility (Young, 2002). This evidence base comes from path-breaking research in fields such as neuroscience, child development and economics, all of which highlight the fact that the first few years of life lay the foundation on which children build their future.

Research in neuroscience, for example, provides strong evidence that the pace of development of the brain is most rapid in the earliest years of life, to the extent that 90 per cent of the brain's growth has already occurred by the time a child is 6 years old (Karoly et al., 1998). Research has further demonstrated that children's early experiences influence brain development, by affecting the formation of the synapses or neural pathways of the brain. Early experiences thus have far-reaching effects on the overall development of the brain and on behaviour. As Young (2007) explains, "*diverse experiences affect the architecture (i.e., wiring) of the brain, the expression of genes and the biochemistry and physiology of the human body – all of which mediate one's cognitive, emotional and social outcomes*".

From an economic perspective, studies across the world have generated evidence of significant returns to investment in high quality ECCE. Nobel laureate

Figure 1.1: Rates of return to investment in human capital



(Source: Heckman, 2007)

James Heckman (2007) has demonstrated that investment in the early childhood stage, when brain growth is at its fastest, yields maximum returns as compared to later stages of childhood and education (Figure 1.1). Britto (2015) cites evidence of increase in preschool enrolment in 73 countries leading to long term benefits ranging from USD6 to USD17 per dollar invested. Recent research by Garcia et al. (2016) in North Carolina examines the impact of early childhood development programmes providing comprehensive preschool and learning experiences to children from birth through age five which were found to generate a 13 per cent per year return on investment.

There is also compelling evidence that in developing countries almost 215 million children below the age of 5 have not achieved their full potential due to adverse early experiences and are at risk of developmental delays and school failure (Lancet, 2011). The recent Lancet Series (2016) examines evidence on long-term outcomes from low income and middle income countries to show, for example, that "*a programme to increase cognitive development of stunted children in Jamaica 25 years ago resulted in a significant, 25 per cent increase in average adult earnings. Conversely, long-term follow-up of children from birth shows that growth failure in the first 2 years of life has harmful effects on adult health and human capital, including chronic disease, and lower educational attainment and adult earning. Moreover, deficits and disadvantages persist into the subsequent generation, producing a vicious inter-generational*

cycle of lost human capital and perpetuation of poverty".

1.3 ECCE quality matters

The positive benefits of ECCE are, however, directly and consistently related to the quality of the intervention (Marope and Kaga, 2015). Longitudinal research such as the High/Scope Perry Preschool Study and the Abecedarian Experience (Ramey & Ramey, 1998; Schweinhart and Weikart, 1997) provide consistent evidence of sustained benefits in terms of cognitive learning and socio-emotional adjustment, particularly for children at risk. However, they caution that these benefits from early childhood education accrue only if the quality of the programme is ensured in terms of standards related to qualified teachers, a validated and developmentally appropriate curriculum, parental involvement, and utilization of feedback from assessments.

These studies, which were initiated in the 1970s, have been followed by further small scale 'experiments' (Early Headstart, Love et al., 2001) and larger cohort studies (Brooks-Gunn, 2003), which found similar evidence. These studies have also pointed to the need to go beyond establishing the simple effects of early education towards an understanding of the familial and educational processes that underlie change in the developmental trajectories of young children.

The Effective Provisioning of Preschool Education (EPPE) Study in England, based on a national sample of over 3,000 children between the ages of 3 and 7, demonstrated positive effects of preschool provisions on children's intellectual, social and behavioural development, while affirming the value of high quality preschool education (Sylva, Melhuish, Sammons, Siraj-Blatchford and Taggart, 2004). A Comprehensive Preschool Education Project in Turkey followed children with and without a rich preschool enrichment programme and demonstrated striking impact of the educational intervention in fostering children's cognitive and social development. Children from the project preschools with richer educational content were found to have higher scores on intelligence, analytical ability and achievement tests in language and mathematics. They were also found to be socially better adjusted (Kagitcibasi et al, 2001). Long term impact was observed in the Chicago preschool project (Reynolds, 2000) where children experienced good quality preschool education implemented by a trained teacher in a small group. Participation in the Child-Parent Centre was observed to be significantly and positively associated with school readiness levels at entry to school and participating children scored higher than the national norms in the Iowa Test of Basic Skills. Similar patterns were also observed in reading achievement over the school-age years.

Impact evaluation of a preschool programme in Mozambique (Martinez, S., Naudeau, S., & Pereira, V., 2012) demonstrated that preschool education is a cost-effective approach to help children from underprivileged backgrounds overcome developmental roadblocks. The study showed that children with preschool experience were more likely to enter primary schooling at the age-appropriate time and were better prepared for school as assessed by tests on cognitive, socio-emotional, and fine motor development. Research in other developing countries shows that participation in a quality early childhood programme is directly related to improved cognitive outcomes, which in turn are reflected in achievement in early primary grades (Aboud, Hossein, & O'Gara, 2008; Engle et al., 2011). Analyses of preschool and primary school performance demonstrate high rates of return to investment in one year of preschool education. Hence a cost-effective approach would be for governments to invest in at least one year of preschool education in addition to primary schooling (Berlinski et al., 2009).

While earlier studies compared children with and without preschool experience, a second generation question that is now emerging relates to how ECD services can be improved (Yoshikawa and Nieto, 2013). This brings the concept of 'effectiveness factors' for early childhood development outcomes into the discourse (Yoshikawa and Nieto 2013; Engle et al, 2007, 2011).

A review of recent studies conducted in the Latin American region, in this context, has identified some factors demonstrating positive impact. Some examples of these include curricular interventions focused on particular domains, such as language or pre-literacy skills (Rolla San Francisco et al., 2006);

on socio-emotional skills (Baker-Henningham et al., 2009); or on increased intensity in professional development for teachers with a focus on classroom practices (Bernal, 2010; Yoshikawa et al., 2011). Each of these interventions included the additional element of a structured curriculum or professional development for the teacher/caregiver.

One important learning from a review of some of these studies is that the factors that emerge as effective could have local relevance and may not be related to structural or process based features that are thought to be universal (Yoshikawa and Nieto 2013). This points to the need for more research in the area of factors effective in diverse contexts to understand the influence of socio-cultural and geographical diversity and identify factors that contribute to programme effectiveness, either by themselves or in an adapted form.

To conclude, as Shankoff (2014) states, "Advances in the biological and social sciences tell us that the period from conception to school entry is a time of both significant opportunity and considerable risk. Multiple interventions during these early years have been designed to address the roots of lifelong disparities in learning, behaviour, and health, and half a century of program evaluation has documented positive impacts on a variety of outcomes. That said, the quality of programme implementation has been highly variable and the magnitude of the impacts has remained fairly stable during the past several decades, consistently falling within the small to moderate effect-size range. The time has now come for a different approach to early childhood investment that catalyzes innovation, seeks far greater impacts, and views best practices as a baseline, not a solution."

1.4 'School readiness': Concept and significance

While the primary objective of ECCE is to enable children to acquire a sound foundation for life, a more immediate and tangible objective is to help them be better prepared for school. A growing body of research demonstrates that children who come to school prepared with certain cognitive and socio-

emotional competencies have better chances of success in the primary grades. The importance of school readiness is further magnified in the context of the international thrust to universalize basic education in the post Jomtien (2000) era, which resulted in large numbers of first generation learners entering school systems across the world. In India, as in many developing countries, a critical concern today is the persistent low levels of learning in primary grades, year after year (ASER Centre, 2006-2017), which may be in large part because children are unprepared for school and/or schools are unprepared for children. An emerging issue is—when can we say that children are 'ready for school' or alternatively, what constitutes school readiness?

Different stakeholders – teachers, parents, communities, educationists, researchers and developmental psychologists – have differing views on the definition of school readiness. These definitions are partly determined by different schools of thought. Readiness for schooling has to a large extent been seen within the *maturationist/nativist* frame which considers only age and maturational status as the eligibility criteria - as evident from the focus on monitoring children's developmental milestones and also from the fixing of official age for entry into school based on maturational levels (Gessell, Ilg and Ames, 1974; Pandis, 2001). On the other hand, the *empiricists*' view focuses on sets of measurable skills and competencies that are visible, relatively universal and can be tested, such as identifying colours, shapes, ability to count, recognize letters, etc. This model misses out on the socio-cultural dimension and the context from which the child comes. The *social constructivists* bring in the contextual focus by emphasizing the values generated through interaction with teachers, parents, and others which scaffold the child's learning along the zone of proximal development. More recent approaches tend to emphasize the bi-directionality between the child and his/her environment from an *interactionist* perspective (Murphy and Burns, 2002), concluding that "*school readiness is a product of the interaction between the child and the range of environmental and cultural experiences that maximize the development outcomes for children"* (Graue, 1992; Meisels, 1998).

A more comprehensive definition of school readiness is located within a framework that has two characteristic features, 'transition' and 'gaining competencies'; and three dimensions: children's readiness for school, schools' readiness for children, and families' and communities' readiness for school. The three dimensions of school readiness therefore are:

- Ready children, focusing on children's learning and development
- Ready schools, focusing on the school environment along with practices that foster and support a smooth transition for children into primary school and advance and promote the learning of all children
- Ready families, focusing on parental and caregiver attitudes and involvement in their children's early learning and development and transition to school. (UNICEF, 2012)

Further, readiness for school needs to be differentiated from readiness to learn. While readiness for school implies being prepared to succeed in a structured learning setting, readiness to learn is a characteristic from birth (Kagan, 1999). Thus, a simple definition for school readiness could be that a child who is ready for school has the basic minimum skills and knowledge in a variety of domains that will enable her to be successful in school (UNICEF, 2012). These could be linked to language, cognitive, psychomotor and socio-emotional domains. Language and literacy would take oral language and emerging literacy into account (Britto, Fuligni and Brooks-Gunn 2003; Snow, Burns and Griffin 1998; Whitehurst and Lonigan 1998). Similarly, there has been much recent interest in and attention to the learning of mathematics before elementary school, at both pre-kindergarten and kindergarten levels, as reflected for example in the fact that in 2000, the U.S. National Council of Teachers of Mathematics revised its standards to include pre-kindergarteners for the first time and many U.S. states incorporated it in their school curriculum. Following a cognitive framework, studies have indicated that programmes designed to enhance basic cognitive ability in mathematics at age 4 to 5 through a readiness approach have a significant effect on mathematics learning in later grades (Case, Griffin and Kelly, 1999; Kaul, 1991). These skills could include early understanding of mathematical

concepts, measurement logic and pre-numeracy skills (Ginsburg, Lee and Boyd 2008; Sophian 2004).

Not limited to one area of development or functioning, school readiness embraces the interrelationships between skills and behaviours across domains of development and learning (Denton 2000; Schoen and Nagle 2004). In addition to cognitive and academic abilities, socio-emotional skills and behaviour are also important factors because of their influence on individual learning and classroom dynamics. Aspects of the social and emotional domain include sustained attention, emotional regulation, ability to follow directions, social relationships and social cognition (McCabe et al. 2004; Raver 2004). Due to inadequate interpersonal skills, a child could face social exclusion and conflicting situations may arise between child and teacher, so that the child's participation in collaborative learning activities may decrease and in effect, adversely affect academic achievement (Ladd, et al., 1999; Pianta & Stuhlman, 2004). Dockett, et al. (2002) found in their study that 36 per cent parents mentioned 'adjustment' as the most significant domain in school readiness. 'Adjustment' was defined in terms of social competence, as the ability 'to socialize and mingle with their peer group' and 'being able to cope without their mother' (Katz and McLellan, 1997). In the same study, 44 per cent teachers also defined adjustment more broadly, to include behaviours such as 'sit and listen', 'do as adults ask', 'follow basic instructions' and 'sit still and concentrate'. Several studies have shown that problem behaviours consistently correlate with lower achievement in school years and children who exhibited high levels of aggression from age 2 through 9 were more likely to have achievement problems in third grade (NICHD Early Child Care Research Network, 2004).

Based on research, school readiness thus emerges as a combination of three domains: *learned behaviours* such as knowing colours and shapes, counting numbers and saying letters of the alphabet; *attitude and emotional competence*, as in listening to directions, being interested in learning and behaving in a socially acceptable manner; and *developmental maturation*, including fine and gross motor development and the ability to sit still for an appropriate length of time. A second aspect of the more recent concept of school readiness is temporality, or understanding of the developmental trajectory of the foundational skills described above. School readiness skills are considered to be cumulative, in that they reflect a hierarchy of achievement based on mastering of earlier skills or goals. In this sense, school readiness combines learning and development because achieving simpler skills allows for the acquisition of higher and more complex skills (Bowman, Donovan and Burns 2001). Children entering primary school, for example, need to have a working vocabulary in order to master reading skills. In other words, learning achievement in school is the product of a process of acquiring skills from birth. Advanced skills build upon the mastery of simpler ones.

In conclusion, according to the EFA Global Monitoring Report (2007), *"the consensus from research is that school readiness encompasses development in five distinct but interconnected domains – physical well-being and motor development, social and emotional development, approach to learning/language development, cognitive development, and general knowledge."* Some specific elements under each of these domains are listed below:

- Physical health and development: Gross motor skills, fine motor skills, health status and practices.
- Social and emotional development: Self-concept, self-control, cooperation, social relationships, music, art, movement, dramatic play approaches to learning, initiative and curiosity, engagement and persistence, reasoning and problem solving.
- Language development: Listening and understanding, speaking and communicating, pre-literacy skills like phonological awareness, book knowledge and appreciation, print awareness and concepts, early writing and alphabet knowledge.
- Cognitive development and general knowledge: Pre-number and number concepts and operations, spatial sense, patterns and measurement, skills related to sequential thinking, reasoning and problem solving, and knowing the environment.

School readiness activities have been shown to be beneficial, in particular for children from disadvantaged communities. Research suggests that household wealth is a key determinant of learning, such that learning inequalities between children

from more and less affluent households are already visible by age 5 (Rose, Sabates, Alcott et al, 2016). The EFA Global Monitoring Report 2009 supports the view that good quality ECE programmes have a strong track record of ensuring smooth transition from home/preschool to school. They facilitate adjustment in school, reduce dropout and retention at initial stages and improve learning achievements, thus narrowing inequalities in education.

1.5 The Indian context: Policy on ECCE

In India, the policy context for ECCE has been relatively vibrant in recent years as compared to the previous decade, with ECCE now being positioned as an area of priority. This policy shift has stemmed from deepening international advocacy for developing and developed countries to enhance their investment in this first, foundational stage of education.

International commitments: India has consistently been a signatory to international commitments in education. The Millennium Development Goals (2000-2015) and Education for All (EFA) goals (1990-2015) had reaffirmed the shared responsibility of governments, donors, UN agencies, Non-Governmental Organizations (NGOs) and civil society groups for reducing the disparity between the 'haves' and the 'have-nots' by 2015. EFA (1990) postulated ECCE as the very first goal to be achieved with the understanding that '*learning begins at birth*'. The Dakar Framework for Action (2000) and Moscow Framework for Action (2010) further reaffirmed international commitment to ECCE. More recently, the Asia Pacific Regional Conference of Ministers on ECCE (Seoul, September 2013) endorsed the need for countries in the region to invest in ECCE and address the issue of "*are children ready for school and are schools ready for children?*" The high-level meeting for South-South Cooperation (October 2013), held in India, also included ECCE as one of the three priority areas for deliberation. Universal ECCE has now become part of a new set of transformative and universal goals outlined in the Sustainable Development Goals developed by the United Nations General Assembly in September 2015.

The policy context: A major landmark in the field of ECCE in India has been the formulation and approval of the National ECCE Policy by the Government of India in September 2013, accompanied by a National Curriculum Framework and Quality Standards. The policy has led to development of state level curricula for ECCE across states, but implementation has been uneven due to variations in state priorities and capacities. The policy also recommends institutionalization of a regulatory and accreditation framework for quality, particularly for the private sector, but this has not yet been initiated.

The original Article 45 of the Indian Constitution (1950) stipulates that the government provide for free and compulsory education for all children up to 14 years of age, thus including children below six years of age. However, the Right of Children to Free and Compulsory Education (RTE) Act (2009) covers children aged 6-14, excluding children below 6 years of age from its legal ambit.

The Government of India brought in a Constitutional Amendment to the original Article 45 which now states that "*The State shall endeavour to provide early childhood care and education for all children until they complete the age of six years.*" Section 11 was inserted in the RTE Act to address this gap, which directs the appropriate governments "*to endeavour to provide preschool education to all children from 3 to 6 years of age so as to prepare them for primary education*".

While this is a welcome provision, it still does not make ECCE a justiciable right of every child. The XII Five Year Plan (2012-17) of the Government of India, now coming to a close, further endorsed this commitment and recommended closer upward linkages in the curriculum with primary education to address foundational learning needs along the early learning continuum and ensure a smooth transition for children aged 3 to 8 years or from preschool to Grade 2. Along with the 2013 National ECCE Policy, these documents provide an enabling policy context for scaling up ECCE equitably and with quality. More recently, the National Law Commission (2015) submitted its report to the government recommending the need for legislation to make Early Childhood Development a fundamental right of every Indian child below 6 years. It also recommended that preschool education be made part of the RTE Act (2009). The Government of India has recently set up a sub-committee of the Central Advisory Board of Education (CABE) to study the feasibility of this extension.

Provisioning for ECCE: India has the distinction of supporting the world's largest public sector integrated programme for children below 6 years of age, known as the Integrated Child Development Services (ICDS). This programme was initiated in 1975 on a pilot basis in 35 administrative blocks of the country. The programme, a centrally sponsored scheme,[4] has evolved over time and has now been universalized, so that at present there are 1.3 million ECD centres known as Anganwadis across the country. These centres are the delivery outlets through which the programme provides a package of six services for holistic child development in a life cycle mode for pregnant and lactating women, children from birth to six years of age, and adolescent girls. The six services broadly include health, education and nutritional support, community mobilization and non-formal preschool education for 3- to 6-year-olds. These services are delivered by a local woman worker and a helper with support from health personnel. Anganwadis serve over 102 million beneficiaries from across India (MWCD, 2015). These include more than 82 million out of 158 million children below 6 years, of which 70 million are in the age group of 3 to 6 years. This makes it probably the largest community based rural ECCE or ECD programme in the world.

The Ministry of Women and Child Development, Government of India, which is the nodal Ministry for the ICDS, also oversees the Rajiv Gandhi Crèche Services for Children of Working Mothers which is a grant-in-aid scheme that supports running of crèches by NGOs. This is implemented through the Central Social Welfare Board and the Indian Council for Child Welfare. These crèches are expected to cater to the underprivileged and provide day care, health and nutrition facilities for children below 6 years, of whom at least 40 per cent are expected to be under 3 years of age. For children in the 3 to 6 age group, the scheme provides for preschool education. According to available statistics, there are 23,293 crèches operating under this scheme (MWCD, 2014-15). In addition, there are ECCE centres being run by NGOs, by corporate organizations (under Corporate Social Responsibility) and Municipal Corporations in some metropolitan cities.

In some cases, state governments have introduced preschool classes within primary schools. The number of preschool sections/classes attached to schools is reported to have almost doubled from 115,372 in 2002-03 (Seventh All India Education Survey, 2002) to 215,931 during the year 2012-13 (Unified District Information System for Education, NUEPA).

The other major provider of ECCE in India is the private sector which has shown steady expansion in the last few decades, possibly facilitated by a sharp increase in parental demand and liberalization of the Indian economy. Recent data on private schooling indicates that approximately 30 per cent children in rural India are enrolled in private schools and that this fraction grew steadily from 2005 to 2014.[5] At the preschool level, ASER data for rural India shows that about 23 per cent of 4-year-olds are enrolled in private ECE programmes (ASER Centre, 2017).

ECCE curriculum: In terms of quality and curriculum for ECE, the National National ECCE Policy (2013) lays down some priority areas for children, which include early stimulation experiences for children below 3 years; developmentally appropriate, play-based preschool education for the age group of 3 to 6 years; and a structured school readiness component for 5- to 6-year-olds. Even prior to this policy, the National Policy on Education (1986) clearly discouraged any formal instruction of the 3R's at this early stage of education and emphasized play-based learning. The National Curriculum Framework (2013) defined age-specific curricular objectives for each of the subgroups within the under-six age range and laid out the basic principles of providing age-appropriate, play-based, integrated, experiential, contextual and inclusive teaching-learning experiences.

[4] Centrally Sponsored Schemes are funds provided by the central government to states to enable the latter to design and implement programmes aiming to achieve national goals or objectives.

[5] The most recent ASER survey of rural children reports that 30 per cent of children in the 6-14 age group are enrolled in private schools; this proportion has not changed since 2014 (ASER Centre, 2017). The Seventh All India survey of NCERT published in 2005 for the entire country reports this proportion at more than 40 per cent.

1.6 Prior research on ECCE in India

As summarized above, ECCE has been the object of increasing policy focus in recent years, resulting in clearer definitions of policy objectives for this age group. Both the National Curriculum Framework developed by MWCD (2013) and NCERT (2005) acknowledge the importance of a developmentally appropriate preschool curriculum, both as foundation for lifelong development of the child as well as in preparation for primary schooling.

Several research studies have explored the benefits of preschool on primary level outcomes but none have probed into the quality and equity dimensions at a large scale. For example, a study conducted with about 38,000 children across 8 Indian states demonstrated that participation in preschool programmes can make a positive difference of about 8 to 20 per cent on retention or continuation rates of children in primary grades (Kaul et al., 1993). Another large study conducted in four regions of the country found that a significantly large number of children come into school with no preschool experience and demonstrate deficiencies in concepts and skills related to readiness for reading, writing and mathematics (NCERT, 1998). Anecdotal evidence from teachers suggests that these deficiencies extend to the psychosocial domain as well, since children with preschool experience are observed to be more confident and participate more actively in school activities as compared to those who come directly to school.

A longitudinal micro study on the impact of mathematical readiness at preschool on performance of children from a disadvantaged community in primary grades indicated significant impact related to curricular quality (Kaul et al., 1995). A more recent impact evaluation of an NGO initiative, covering Anganwadi centres across Bengaluru city, Karnataka, indicated that while bringing in focus on the preschool component of the integrated programme through supply of play materials and short trainings can lead to a positive shift in the overall environment of the Anganwadi Centre, specific curricular inputs may be required to improve children's school readiness levels (Kaul, Chaudhary, and Sharma, 2013).

To summarize, while smaller studies addressing specific dimensions of preschool provisioning and impact have been conducted in India, there has been no large scale empirical research to examine the status of ECCE in India in terms of access, participation, quality or impact on children's readiness for school and later learning, particularly for marginalized groups. This has made the design of evidence-based interventions to achieve policy objectives a complex task. Despite being home to the ICDS scheme, which is the largest public initiative in the world in the area of integrated child development for children below six years, there is thus a significant dearth of large scale research evidence on ECCE in India. The present study is an effort towards filling this gap.

Chapter 2

Introduction to the IECEI Study

A note on terminology

Chapter 1 summarized the current global understanding of Early Childhood Care and Education, or ECCE, as a holistic range of early care and stimulation inputs and experiences required for children from birth to 8 years; in India, this stage is defined as covering children up to 6 years of age. Based on the recommendations of the National ECCE Policy, 2013, we can further divide this period into two broad units of focus. Early childhood care addresses early stimulation for children below 3 years of age, while early childhood education (ECE) aims to create and deliver developmentally appropriate, play-based preschool education for children between age 3 and 6 years.

Given that the focus of the IECEI Study is to investigate children's early education experiences and to explore their impact on school readiness and later primary school outcomes, we focus on the ECE component of children's early years, with preschools forming the major site of inquiry. The terms ECE centre and preschool are used interchangeably in this context.

2.1 Introduction

Chapter 1 provided an overview of international research over the past few decades that highlighted the fundamental importance of the early years of children's lives for their future cognitive and social development. Children without access to developmentally appropriate inputs and experiences fall behind their more advantaged peers very early on.

ECE has been identified as a key area of intervention that can rectify this situation. There is strong evidence that intervening early to ensure children's preparedness for school can play an important role in reducing equity gaps between children from more and less advantaged homes. The need for early interventions to build children's "school readiness" is particularly urgent in the context of near universal school enrolment, when all children are expected to be in school, with a large proportion being first generation learners.

In India, as a result of concerted efforts from policy makers and parents alike, elementary school enrolment rates have been well over 90 per cent for more than a decade. However, a growing body of evidence suggests that large proportions of children are struggling to acquire even the minimum

knowledge, skills, and abilities prescribed by school curriculum. As noted previously, research suggests that the gaps between children who benefit from schooling and those who do not are explained in large measure by the characteristics of the households to which they belong.

In other words, in India too, large proportions of children may face learning disadvantages before they even enter school. The benefits of addressing this early disadvantage are enormous, for the future of these children and for the country as a whole. But we know much less about younger children, in the years before they enter school. Perhaps the only source of data on scale regarding young children's preschool participation in India is the ASER survey, which asks whether children in the 3-6 age group are enrolled in any type of preschool (or, in the case of children age 5 and older, school). ASER data show, for example, that for the past several years, more than three-quarters of all 4-year-olds in rural India have been enrolled in a preschool facility – Anganwadi, Balwadi, Lower Kindergarten (LKG) or Upper Kindergarten (UKG). The fact that most young children are already enrolled in some form of preschool programme implies that these facilities are widely available across the country, although significant variations are visible across states. But little is known about the quality of these institutions or the impact of children's participation on their subsequent development.

The IECEI Study is the first large scale study in rural India that examines young children's participation in preschools, the quality of the institutions that they attend, and the short- and medium-term outcomes of this participation. While there is evidence of the importance of school readiness, including both cognitive, language and adaptive behaviour in Western literature, there is no large scale research in the Indian context that assesses the status of these variables in the child population or their impact on children's performance at the primary stage of education. This study therefore explores the impact of participation in preschool education on school readiness, conceptualized in terms of cognitive (including language) and personal social skills and behaviour; and further explores whether this impact is sustained during the early years of primary school. The research primarily focuses on one key aspect of early childhood care and education, that is, the *educational or early learning component* for children in the age group of three to six years.

Specifically, the study aimed to answer the following questions:

- In which institutions do children participate between ages 4 and 8, and how do these patterns vary over time and across locations?
- What is the impact of these participation trajectories on children's school readiness at age 5?
- Does higher school readiness at age 5 improve children's learning outcomes at age 6, 7 and 8?
- Is the relationship between preschool participation and subsequent learning outcomes similar for all children, or do the outcomes vary depending on children's personal and household characteristics?
- Are there specific dimensions or characteristics of preschools that improve children's readiness for school, and that can therefore be identified as components of 'quality' early childhood education in the Indian context?

To answer these questions, the IECEI Study was designed as a large scale, longitudinal, mixed-methods study, implemented over a period of five years (2011-2016).

2.2 Coverage

The IECEI Study was implemented in three major Indian states: Andhra Pradesh (in districts that became part of the newly created state of Telangana in 2014, midway through the study), Assam, and Rajasthan. These states differ markedly from each other on a range of social, economic, educational and geographic indicators. For instance, while Rajasthan and Assam have a higher percentage of scheduled tribe (ST) populations, the population of scheduled caste (SC) individuals is higher in Telangana and Rajasthan. These states also vary significantly in terms of female literacy rates, with Assam being highest (67.3 per cent) followed by Telangana (57.9 per cent) and then Rajasthan (52.7 per cent). In terms of gross state domestic product, Rajasthan and Telangana are more affluent relative to Assam.

Within each state, two districts were purposively selected for inclusion in the study. In each case, at

least one district was selected specifically because a "known practice" preschool programme – one that was regarded by many experts as providing an alternative, more appropriate environment and curriculum for young children – was being implemented in that district. This was done to ensure variation in the types and characteristics of the preschool programmes being attended by children in study locations, so as to subsequently examine whether variations in outcomes could be linked back to differences in the nature and quality of the programme attended. The districts included in the study were Dibrugarh and Kamrup in Assam, Ajmer and Alwar in Rajasthan, and Medak and Warangal in Telangana. Selected characteristics of these districts are provided in Appendix 2.1.

2.3 Sampling

The IECEI Study design responds to the twin objectives of generating a) district level estimates of key participation and outcome indicators, thus requiring larger, randomly selected sample sizes, and quantitative indicators; and b) a more detailed, nuanced understanding of the characteristics of preschool programmes and their impacts on children – requiring smaller samples, longer periods of data collection, and more varied data collection methods. The study was thus designed as two separate strands, each with measures and methods appropriate to its objectives, linked by a common village sampling procedure and a common set of core indicators. A third strand comprised a series

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of case studies of selected preschool programmes in different locations in India. An overview of each strand's objectives, sample, and methods is provided in Table 2.1 below.

Table 2.1: Overview of the IECEI Study objectives, sampling and methods

Strand	Objectives	Sampling & Methods	Sample
A	To derive district level estimates of: (a) Children's preschool and school participation from age 4 to age 8, (b) Children's school readiness levels at age 4 and 5, and (c) Children's early grade learning outcomes at age 6, 7 and 8, To analyse the relationship between preschool participation trajectories and learning outcomes.	50 villages in each district, randomly sampled from Census 2001[6] 50 4-year-olds in each village, randomly sampled from the ICDS survey records for the village[7] Sampled children tracked longitudinally for 4 years Total of 12 rounds of data collection using survey methodology[8]	306 villages 11,225 children age 3.5-4.5 at baseline visit 1,591 preschools attended by sampled children at baseline visit
B	To (a) study variations in content and processes across different types of preschools - public, private and voluntary; and (b) Identify programme elements that demonstrate significant impact on children's school readiness and subsequent early grade outcomes.	About 10 villages from each selected district, randomly sampled following Strand A procedures Listing and survey of all 4-year-olds in each village from the ICDS survey records for the village Children attending 'community preferred' preschools (those attended by at least 5 children) were selected along with all non-participating children Children tracked longitudinally for 4 years 10 rounds of data collection using survey and observation methods	75 villages 298 preschools 2,779 children age 3.5-4.5 at baseline visit
C	To (a) conduct in-depth case studies of preschool programmes considered to be examples of 'good practice', and (b) provide a more nuanced assessment of quality in terms of content, process, facilities, and parental choices and beliefs in selected preschool programmes located in different states in the country, including those not covered in the sample of the study.	9 preschool programmes identified from different parts of the country. Qualitative methods including interviews, observations and focus group discussions	9 purposively selected preschool programmes

[6] In order to ensure adequate variation in the provision of preschools within sampled villages, sampling was restricted to villages with population of 2,000 or more. Within each district, a total of 60 villages sampled across Strand A and Strand B were selected such that villages from every block were included.

[7] The specified sample of 50 children per village turned out to be overly ambitious despite the fact that smaller villages were excluded from the sample. In many villages, even a census of all 3.5- to 4.5-year-old children in the village did not yield the desired number of children.

[8] One round of data has been excluded from this report because of issues with data quality; all analyses in this report are therefore based on 11 rounds of data for Strand A.

2.4 Methodology

Both strands A and B of the IECEI Study tracked sampled children's preschool participation over time, and also assessed their school readiness outcomes (at age 4 and 5) and early grade learning outcomes (at age 6, 7 and 8) from the perspective of emergent and early literacy and numeracy. In addition, both strands also collected data on a set of domains that emerge as important from the *interactionist* viewpoint on school readiness discussed in Chapter 1. Specifically, the study collected detailed household characteristics of the sampled cohort of children to assess the contribution of these factors to children's school readiness and later learning. Further, since quality of the preschool programme was expected to be a significant factor in terms of impact, the methodology incorporated a comprehensive quality assessment of a subset of preschool and early grade programmes, to assess quality of these institutions and their impact on children's school readiness and subsequent learning in school. Finally, the study also included methods and measures to study parental choices with respect to sampled children's preschool participation in a small subset of households. A detailed description of the tools and schedules used in the study is available in Appendix 2.2.

Table 2.2 summarizes the fieldwork calendar for the IECEI Study and Table 2.3 presents the sample distribution for both individual strands as well as for the study as a whole.

2.5 Ethical considerations

The IECEI Study was launched in 2011 to enrich empirical knowledge in the area of early childhood education in India. Several measures were put in place to ensure that the study was implemented in an ethical and responsible manner.

Given that this was a five-year longitudinal study and that the findings from this research were expected to influence and inform policy on ECCE in India, the study was implemented with the consent and approval of the Ministry of Women and Child Development, the nodal ministry/department for early childhood care and education in the country. Since this longitudinal study examined the impact of preschool on later educational outcomes of children, the Ministry was also involved in the planning and design of the study along with the Department of School Education and Literacy of the Ministry of Human Resource Development.

A coordination committee instituted at the beginning of the study was tasked with (a) reviewing the implementation plan and progress of the study (b) facilitating/resolving any logistical issues with regard to its implementation at central/state levels. This committee comprised members from the ministries, partner organizations, and representatives of funding organizations. Meetings were organized more frequently in the initial three years of the study as more logistical issues emerged during the early phases. Permissions were also taken from the respective state and district departments to carry out the research.

A research advisory committee was constituted for the study which comprised eminent quantitative and qualitative researchers, both national and international; research partners and institutions; representatives from national organizations; and representatives of the funding agencies. The research design, methodology, sampling, identification and design of tools, and analysis plan were finalized in consultation with the committee. This process ensured that there were no conflicts of interest among any of the parties involved – project staff, implementation partners, advisory bodies, funding organizations, government departments, community residents and children themselves.

In terms of field work, field investigators in all strands were either trained researchers or individuals who underwent intensive training on the study, its objectives, and the various data collection instruments and processes of administration. At baseline, when the households of sampled children were visited, oral consent was obtained from parents after explaining the objectives of the study. Respondents were neither paid nor otherwise compensated for their participation in the study. Special care was taken when dealing with children, particularly during the one-on-one assessment rounds. Investigators spent some time interacting with children and establishing rapport with them via play-based activities before beginning the assessments, and sampled children were not forced to participate in the assessment if they were uncomfortable doing so. Research

Table 2.2: The IECEI Study data collection calendar

Year	2011	2012			2013			2014			2015		
Period	**Aug-Dec**	**Feb-Mar**	**Jul-Aug**	**Aug-Dec**	**Feb-Mar**	**Jul-Aug**	**Aug-Dec**	**Feb-Mar**	**Jul-Aug**	**Aug-Dec**	**Feb-Mar**	**Jul-Aug**	**Aug-Dec**
Village and household information													
Village survey (Strand A + B)	√*												√**
Household survey (Strand A + B)	√ *								√ ***				
Sample child information													
Child tracking sheet (Strand A)	√	√	√	√	√	√	√	√	√	√	√	√	√
Child information sheet (Strand B)	√	√	√	√	√		√	√		√	√		√
Preschool and school information													
ECE rapid facility survey (Strand A)	√	√	√	√	√	√	√	√	√				
School information sheet (Strand A)			√	√	√	√	√	√	√	√		√	√
Assessment of programmes (Strand B)	√	√		√			√			√			√
Learning assessments													
School readiness instrument (Strand A + B)	√			√									
Adaptive Behaviour Scale (Strand B)	√			√									
Early Grade Assessment (Strand A + B)							√			√			√
Psycho-social Assessment (Strand B)							√			√			√

* Data collected for Strand A and Strand B (Village and household survey)
** Data collected for Strand B (Village survey)
*** Data collected for Strand A (Household survey)

Table 2.3: Sample description, IECEI Study

State	District	Strand A					Strand B						Total	
		Baseline sample			% sampled children who were:		Baseline sample			% sampled children who were:			Baseline sample	
		Villages	Children	Preschool facilities	Tracked at visit 12	Assessed on all 5 assessment rounds	Villages	Children	Preschool facilities	Tracked at visit 10	Assessed on all 5 assessment rounds	Villages	Children	Preschool facilities
Assam	Dibrugarh	51	1405	349	79.8	56.7	13	363	75	64.5	64.5	64	1768	424
	Kamrup	50	2105	189	77.3	49.6	16	650	42	68.8	68.8	66	2755	231
	Total	**101**	**3510**	**538**	**78.3**	**52.5**	**29**	**1013**	**117**	**67.2**	**67.2**	**130**	**4523**	**655**
Rajasthan	Alwar	52	2375	318	85.4	63.8	7	393	27	62.6	62.6	59	2768	345
	Ajmer	51	2169	259	84.3	64.4	15	464	27	63.4	63.4	66	2633	286
	Total	**103**	**4544**	**577**	**84.9**	**64.1**	**22**	**857**	**54**	**63.0**	**63.0**	**125**	**5401**	**631**
Telangana	Medak	51	1804	210	77.9	52.9	13	519	75	77.6	77.7	64	2323	285
	Warangal	51	1367	266	80.1	53.8	11	390	52	71.3	71.3	62	1757	318
	Total	**102**	**3171**	**476**	**78.9**	**53.3**	**24**	**909**	**127**	**74.9**	**74.9**	**126**	**4080**	**603**
TOTAL		**306**	**11225***	**1591**	**81.1**	**57.4**	**75**	**2779**	**298**	**68.4**	**68.4**	**366****	**14004**	**1889**

* This total excludes 603 children who were originally part of both Strand A and Strand B samples but were later dropped from the Strand A sample in March 2013. They are still included in the Strand B sample description.

** The sample for this study included a total of 366 villages. The total for sampled villages in Strand A and Strand B exceeds this number due to an overlap of 15 villages which were included in both Strand A and Strand B fieldwork. While the villages remained common, sampled children across the two strands differed.

teams went to considerable lengths to ensure that friendly and cordial relations were developed and maintained with these households and children, a large proportion of whom were tracked over the subsequent four years.

With respect to data management, in order to protect respondents' privacy, all information that could be used to identify specific locations or individuals was removed from all data sets. Care has been taken to maintain confidentiality in all materials related to this study.

Chapter 3

The landscape of ECE: A glimpse into supply and demand

Chapter summary

This chapter discusses the provisioning of preschool facilities in 357 out of 366 villages that were sampled for this study. The chapter first examines 'supply' factors, i.e., the availability of preschool facilities in sampled villages, and subsequently explores parents' opinions ('demand' factors) regarding the kinds of preschool facilities that they preferred for their children.

Preschool facilities were available in all 357 villages across 3 states

- Every village had at least one preschool (Anganwadis, privately managed preschool facilities integrated with primary schools and – in a handful of cases - centres run by voluntary, religious, or other kinds of organizations). Preschools were most widely available in Rajasthan, where more than 80 per cent of sampled villages had four or more preschool options.
- In all three states the majority of preschool centres in sampled villages were government Anganwadis, which existed in every village. States varied substantially in the availability of privately managed preschools. While just 7 per cent of preschools in Assam were privately managed, villages in Rajasthan had the highest private provisioning amongst these states with 40 per cent of privately managed preschools.

Parents prefer private preschools, as they focus on formal reading and writing and are often English medium

- Many parents felt that children should be able to read, write and develop basic numeracy in preschool, even before they enter primary school.
- Parents prefer preschools with English as a medium of instruction.
- According to parents, preschool teachers should spend more time teaching rather than being engaged in non-teaching tasks.
- For these reasons, parents in all three states articulated a clear preference for private preschools over government preschools.

3.1 Introduction

In this chapter we briefly describe two important contextual factors that influence parental decisions with regard to whether and where to send their young children. These comprise the availability of preschool facilities for this age group in sampled villages ('supply' factors) on the one hand, and parents' opinions regarding these facilities ('demand' factors) on the other.

Clearly, these two factors – the supply of and the demand for specific kinds of preschool facilities – are not independent of each other, nor are they static over time. For example, expansion in the availability of preschools in a given locality can generate increased demand by increasing both the affordability and the social desirability of preschools. Likewise, growing parental demand for better options for their children may in turn encourage the establishment of new preschools. This chapter does not address this interaction or the ways in which demand for and supply of preschool facilities evolved over time; rather, it attempts to provide some context for the remaining chapters by laying out the broad contours of both demand and supply factors at specific points in time during the study.

Note on the different types of educational institutions in this study

Anganwadis: There are about 1.3 million Anganwadi Centres (or courtyard centres) across the country, operating under the centrally sponsored ICDS programme of the Ministry of Women and Child Development. These centres offer six services to pregnant and lactating women and children from birth to 6 years of age. These include services related to health and nutrition, community awareness and non-formal preschool education for children between 3 to 6 years of age. While the basic design of this programme is common across states and is now universalized, there are variations across states in terms of quality of implementation.

Private Schools: The private school category in this study refers to privately managed rural schools that offer both preschool and primary education. These institutions are in some cases unrecognized by any state education authority, due to which no comprehensive data on their numbers exists. In the absence of accreditation and regulation procedures, they often fail to conform to quality specifications related to infrastructure, teachers, training, curriculum, etc.

Government Primary Schools: These schools are run by state governments. According to the RTE Act (2009), free and compulsory education is a legal entitlement of every child between ages 6 to 14. All sampled villages had at least one government-run primary school.

3.2 Preschool facilities in sampled villages

Chapter 1 touched upon the fact that India is home to the world's largest integrated programme in the public sector for children below 6 years of age, known as ICDS, which offers a range of services to young children, adolescent girls, and pregnant women.[9] In addition, the rapid expansion of private schools in many states of the country has extended downward to cover the preschool sector as well. There is no source of comprehensive information on this rapidly growing provision of preschool facilities across the country.[10] We begin by describing this 'provisioning landscape' in terms of the ECE facilities that were available in sampled villages during the first wave of fieldwork for this study in 2011. Table 3.1 presents data on village level provisioning of preschools for 357 of the 366 villages sampled for both the strands of this study. Of a total 1,796 centres listed across these villages, the maximum number of centres were located in Rajasthan (627), followed by Assam (616) and then Telangana (553).[11] While virtually all sampled villages in all states had at least one government preschool, states vary

[9] For more information on the ICDS programme, see http://wcd.nic.in/schemes/integrated-child-development-servicesicds

[10] The Unified District Information System for Education, or UDISE, includes comprehensive information on schools and provides some data on preschool grades offered within schools. However, given the variety of ECCE programmes available to children in India, as discussed in Chapter 1, there is no single equivalent source of information for preschool facilities in India.

[11] The numbers of preschools listed do not match with those presented in the sample description (Table 2.3) due to missing data for 9 villages.

Table 3.1: Availability of preschools in sampled villages, by state, Strand A + Strand B, Wave 1 (September-December 2011)

State	No. of villages	Total no. of preschools listed	% of villages with:		% villages with:			
			At least one government preschool	At least one private/ other preschool	Up to 3 preschools	4-6 preschools	7 or above preschools	Total
Assam	115	616	99.1	27.8	36.5	27.8	35.7	100
Rajasthan	120	627	100.0	93.3	18.3	56.7	25.0	100
Telangana	122	553	100.0	41.8	44.3	42.6	13.1	100
Total	**357**	**1796**	**99.7**	**54.6**	**33.1**	**42.6**	**24.4**	**100**

substantially in the availability of privately managed preschools, with the highest private provisioning in Rajasthan. Sampled villages in Rajasthan were very likely to have at least one private preschool facility (93 per cent) followed by those in Telangana (42 per cent). Villages in Assam were much less likely to have a private preschool (28 per cent).

Sampled villages in Rajasthan were easily the best provisioned in terms of the total number of early childhood education centres available. More than half of all villages had at least 4 preschools, and one out of every four villages had more than 7 centres located within the village. Sampled villages in Telangana, on the other hand, had the lowest concentration of preschool facilities available within a village; close to half of these villages had up to 3 preschools. Villages in Assam lay in between these two extremes.[12]

Table 3.2 presents the distribution of preschools by management type for 1,764 preschools.[13] These comprised Anganwadis, Ka-shrenis, privately managed preschool facilities (usually attached to primary schools) and, in a few cases, centres run by voluntary, religious, or other kinds of organizations.

Overall, in 2011, close to 7 in every 10 preschools listed in sampled villages were Anganwadis, although these proportions differ for each state. In Rajasthan, Anganwadis comprised a little over half of all preschools, while 4 in every 10 were private preschools. In Telangana, almost 8 of every 10 preschools listed were Anganwadis while approximately 2 in every 10 were privately managed preschools. Assam on the other hand is an exception among these states, with the availability of two kinds of government preschools: while three

Table 3.2: Preschools in sampled villages by state and management type, wave 1 (September-December 2011)

State	Total no. of preschools	% of preschools by management type:				
		Anganwadi	Ka-shrenis	Private	NGO/Other	Total
Assam	592	76.5	15.7	7.3	0.5	100
Rajasthan	622	56.4	0.0	40.5	3.1	100
Telangana	550	78.0	0.0	19.6	2.4	100
Total	**1764**	**69.9**	**5.3**	**22.9**	**2.0**	**100**

[12] These trends mirror the differences seen between states in terms of the number of 4-year-olds found. Villages in Rajasthan had the highest average number of sampled children per village while those in Telangana had the lowest.
[13] 32 out of 1,796 preschools with missing management type data are excluded from this table.

quarters of all preschools listed were Anganwadis, there were also 93 Ka-shrenis – the preschool class attached to government schools - comprising 15 per cent of the distribution. Assam also had the lowest proportion of private preschools among all sample states.

3.3 What did parents look for in preschools?

A key finding from sample survey of the IECEI Study, highlighted above, is that private schools with preschool sections were available in all three states, although to varying extents. Anecdotal evidence suggested that these schools catered largely to the aspiring middle and lower middle-class sections of the villages. Thus, as part of the smaller Strand B of the IECEI Study, a qualitative micro-study was conducted to examine the formation, growth, functioning and role of private schools vis-à-vis the social and political dynamics of public/private school systems. The purpose of the micro-study was to understand the current local and grounded reality of the emergence of private preschools/schools in India, and how this influenced the choices made by families and communities to shape children's patterns of schooling.

The micro-study was conducted in one village in each of the three IECEI Study states. Villages with approximately equal numbers of private and government schools were selected. The study used interviews, focus group discussions, and observations; participants included children, parents, community members, school, teachers, principals, school owners, other government officials, and *Panchayat* members.

Overall, there was broad consensus among parents and community members in the selected villages that there was indeed a growing preference for private preschools and schools over Anganwadi centres and government schools. Four commonly held opinions that underlie this trend are described below.

Formal teaching begins early in private schools

Parents and community members in all states articulated an appreciation of private schools in making children read and write, as well as the practice of giving homework. According to parents, there was an emphasis on learning to read and write in private preschool classes; while in the government system, children only began to learn these skills in Grade 1. This aspect was articulated most strongly in Rajasthan, where the importance of curriculum expectations from parents played a major role in determining preferences for private as opposed to government schools. Similarly, in both Rajasthan and Assam, the private school focus on compulsory attendance, regular homework and examinations were spoken of favourably.

In the absence of either regulation or an understanding of developmentally appropriate curricula for children, private schools appeared to be catering to these expectations, leading many parents to send their children to them.

Private school teachers spend more time teaching

One frequently cited point of difference between government and private schools had to do with teachers. Although parents in Rajasthan and Assam acknowledged that government school teachers were better educated and trained than those in private schools, they spoke about the former being burdened with a range of non-teaching responsibilities like organizing mid-day meals, surveys and so on. These additional responsibilities took away from the time spent on teaching. Community members in Telangana also pointed out that despite being better paid, government school teachers lacked discipline and were neither punctual nor regular in attendance, which in turn led to non-functioning classes and loss of teaching time. In Rajasthan especially, parents cited non-functionality of Anganwadis, stating that Anganwadi workers were often away from these centres, leading to strong preferences for private preschools among the community.

Another point raised by parents in all three states was regarding the shortage of teachers in government schools. They felt that private preschools/schools ensured at least one teacher per class and that even if a teacher was absent, there was a replacement so that the classes were not hampered. This was generally not the case with Anganwadis and government schools, where most government schools had a less than adequate numbers of teachers thus either resulting in classes remaining idle or an increase in multigrade teaching.

Private schools are often English medium

The aspiration for English came up in discussions with parents and the community in Telangana. English was seen by parents and community alike as a major factor contributing to the surge of private schools. Even in the case of preschools, "*good handwriting*", i.e., practicing/copying letters, was often understood as learning English. Parents spoke about actively choosing the best schools for their children and their appreciation for the fact that private schools used English as the medium of instruction, often sending children to schools in nearby villages and towns in order to access English-medium schools.

Private schools have become more affordable

In all three locations, families could increasingly afford private education for their children through a mix of increase in income as well as strategies employed by private schools.

In Rajasthan for example, the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) guarantees 100 days of employment, assuring poorer households of a minimum income and in consequence greater budgets for spending on children's education. Private schools, many with preschool sections, did their part by allowing parents to pay fees in three or four instalments spread over a year.

In Telangana, community members articulated their dissatisfaction with sub-standard facilities and the lack of minimal infrastructure in government schools, such as students' desks, tables, stools, carpets, teacher's chairs, black boards, drinking water, limited space, lack of playgrounds and teaching materials. Even though government schools provide free uniforms, lunch and books,

poor parents opt for fee-charging private preschools in place of Anganwadis.

Alongside this increasing affordability and preference, there was also an articulation of an economic and social divide, with private schools being viewed as more exclusive and of higher social status. In Assam and Telangana for example, parents opined that government schools were reserved for children from poorer households with parents in low-income work (like daily wage labour) or whose mothers were not educated, whereas dominant and better off communities were more likely to send their wards to private schools. In Rajasthan, similar articulations were made along caste lines.

3.4 Concluding thoughts

The quantitative and qualitative evidence presented in this chapter highlights two interrelated aspects of provisioning: the availability of preschool institutions and the growing preference for private institutions (both schools and preschools).

With respect to preschool facilities, there was universal availability of government preschools across sample villages in the study. On the other hand, the availability of and access to private preschools was more varied among states, with Rajasthan having the highest availability of such institutions, followed by Telangana and Assam.

Notwithstanding the macro level provisioning differences, at the micro level we find a clear preference for private education among parents from three villages in the qualitative sub-sample. This preference seems to stem from a variety of reasons related to the (perceived or actual) shortcomings of the government preschool and school education system as well as the advantages of private schools.

Against this backdrop in terms of the availability of facilities in sampled villages at the beginning of the study and community perceptions regarding the same, we now turn to an examination of sampled children's participation trends from age 4 to age 8.

Chapter 4

Where are children between age 4 and age 8?

Chapter summary

This chapter examines broad trends in children's participation in preschools and schools and tracks their transition trajectories over time and across states. The chapter also explores the relationship between these trajectories and children's individual, parental and household characteristics.

Where are 4- to 8-year-old children?

- Overall, more than 80 per cent of sampled children were already participating in an institutional setting at age 4. However, differences in participation are visible across states:
  - ❖ Over one-third of 4-year-olds in Rajasthan did not participate in any institution, compared to less than 10 per cent in Assam and Telangana.
  - ❖ Among children in Rajasthan who were participating in preschools, the majority were going to privately managed facilities. In Assam, most were participating in government-run preschools (Anganwadis or Ka-shrenis). In Telangana, while over half of all sampled children were in Anganwadis, a large proportion also participated in private preschools.
  - ❖ Even at age 4, large proportions of these very young children were observed in primary schools in Rajasthan (12 per cent) and Telangana (8 per cent).
- As children grow older (5-8 years), their participation in an institutional setting becomes almost universal. But participation trajectories during these early years vary across states.
  - ❖ Between age 5 and 8, most children in Assam participated in government-run institutions at both the preschool and primary school stage. In Telangana, while most children participated in privately managed preschools, their participation in government primary schools increased with age. And in Rajasthan, most children participated in privately managed institutions at both the preschool and primary school stage.
  - ❖ Children's exposure to preschool was relatively low in Rajasthan and Telangana in comparison to Assam. While nearly half of the sampled children in Rajasthan and Telangana were already attending primary school at age 5, large proportions of children in Assam continued to participate in preschool even at age 7.

- ❖ Mixed trajectories entailing back and forth movement between preschool and primary school grades were seen among relatively high proportions of children in Telangana (24 per cent) and Rajasthan (16 per cent).
- ❖ Thus, although the RTE Act recommends that children begin Grade 1 at age 6, data from this study indicates that it was only at age 8 that these trajectories stabilized with over 90 per cent of the sample in each of the three states participating in primary school.

What factors influence these participation trajectories?

- Girls and children from economically disadvantaged households were more likely to participate in government-run institutions – both preschools and primary schools.
- Boys and children from relatively better off households were more likely to participate in privately managed institutions at both preschool and primary school stage.

What do we mean by "participation"?

Several research studies in India have shown that enrolment in school is not an accurate measure of children's participation (Banerji and Kingdon, 2009; Bhattacharjea, Banerji and Wadhwa, 2011). Unlike in most western countries, where enrolment is synonymous with attendance, student attendance in India is influenced by a number of extraneous factors (Drèze and Kingdon, 2001). The Annual Status of Education Report has repeatedly found that while enrolment rates are very high across India, overall rates of attendance in government schools are low and vary across states (ASER Centre, 2006 - 2017).

As part of this study, tools and procedures were developed to collect data on sampled children's participation from three sources: household respondents, institutional records, and direct observation of children in preschools and schools. Field investigators first collected information from family members. Specific questions were asked about sample children's "official" or "formal" enrolment as well as "unofficial" or "informal" participation - cases where the child, was attending an institution although not enrolled. Subsequently, all preschools and primary schools were visited in each sampled village and an attempt was made to track individual children to specific institutions, using the information provided by parents as a starting point. Field teams examined enrolment and attendance records and also observed whether sampled children were present at the time of the visit.

In several cases the information provided by parents did not match with that obtained from the centres. For example, a child who family members said was neither enrolled nor attending was observed in a preschool or primary school, or was found on the enrolment register of a different centre than the one mentioned by her parents. Family members were not always aware of the distinction between enrolment and attendance. Thus, parents' characterizations of children as enrolled, attending, or non-participating were not necessarily consistent with observations of survey investigators. Mismatches between information collected from households and from preschools and schools were encountered across all states and districts included in this study. In such cases, primacy was given to observations of the investigators.

For the purposes of this report, therefore, the term 'participation' is used in the widest possible manner to capture as accurately as possible *where the child was going*, regardless of his/her official enrolment status. If field teams were unable to visit the institution that parents specified, then the information provided by parents was assumed to be accurate. In cases where children were found to be double enrolled, attempts were made by teams to verify which centre was more regularly attended.

Separately, sampled children's *attendance* was also recorded. Because these are young children, they went irregularly to preschool facilities, especially in the initial years of the study. Whereas 'participation' information was constructed from several sources, attendance captured whether survey teams actually observed the child in a preschool (or school). Observed attendance was noted for all sampled children from the third round of fieldwork onwards. In the first two waves of fieldwork, data collection was restricted to institutions within the village which meant that attendance data was not collected for children going to institutions outside their village. Therefore attendance data, where used, is only reported from the third round of fieldwork onwards.

4.1 Introduction

What do young children in rural India do between the ages of 4 and 8? Are they at home or in a preschool, or perhaps in the early grades of primary school? What kinds of institutions do they go to, and once participating in an institution, do they tend to stay there or move elsewhere? Do children in Assam show the same sorts of patterns as those in Telangana? Do boys and girls have similar participation trajectories? This chapter explores these and similar questions using data from the large sample survey (Strand A). Children's participation data were collected over 12 field waves spread over four years (September 2011 to December 2015).[14]

We begin with an examination of broad trends in children's participation at different ages, with the objective of identifying key transition stages from preschool to school. In later sections, we combine data from multiple field waves to identify major participation pathways or trajectories. Finally, we explore whether differences in these participation trajectories are correlated with child characteristics such as gender or household characteristics such as affluence and mother's education.

4.2 Age-wise trends in children's participation

Age 4

The first round of fieldwork for the study was conducted in September-December 2011 when sampled children were between 3.5 and 4.5 years old. Table 4.1 presents participation data for 11,828 children during this visit. Strikingly, at age 4, over 80 per cent of all sampled children were already participating in an institutional setting. However, enormous differences are visible across the three states covered by the study.

- The first major difference is in the proportion of non-participating 4-year-olds. In Rajasthan, this proportion is high, with one in every three children reported as not participating anywhere. In Assam and Telangana, far smaller proportions of 4-year-olds are not participating (11 per cent in Assam and just 6 per cent in Telangana).

- There are also variations with respect to the institutions in which children were participating.

Table 4.1: % Sampled children age 4 in preschool or school, by state and institution type

State	N	Government preschool	Private or other preschool	School	Other centres[15]	Not participating anywhere	Total
Assam	3,837	79.1	6.5	0.3	3.3	10.9	100
Rajasthan	4,670	21.3	32.0	12.3	1.1	33.3	100
Telangana	3,321	52.6	32.1	7.9	1.4	6.1	100
All children	**11,828**	**48.8**	**23.8**	**7.1**	**1.9**	**18.4**	**100**

[14] The findings presented here are based on 11 rounds of field work. Data from the 5th wave of the study is not included due to high proportions of missing information.

[15] In the first wave of fieldwork, information on the type of the institution could not be documented for a small proportion of children and thus it is unclear whether these institutions were preschools or schools, government or private institutions. Such institutions have therefore been categorized as 'other centres' for this round.

In Assam, 4 out of every 5 children were going to government preschool facilities, mostly Anganwadis.[16] But in both Rajasthan and Telangana, a sizeable proportion of children, close to a third of the sample, were going to private preschools. In all states, a small proportion of children participated in institutions situated outside the village whose management type was not captured during this first round of fieldwork.

- In both Telangana and Rajasthan, significant proportions of these very young children were observed in primary schools. This proportion is highest in Rajasthan (12 per cent) followed by Telangana (8 per cent). Much of this participation may have been informal in nature, where sampled children were sent with older siblings to school but not necessarily enrolled.[17]

Patterns in young children's participation in educational institutions are thus neither straightforward nor similar across the country. A Ministry of Human Resource Development report documents that both Rajasthan and Telangana have a lower age norm for entry into Grade 1 (5 years) as compared to Assam (5+ years) (MHRD, GOI 2014, p.6-7). Although it is difficult to conclusively draw linkages between school participation among young children and state level policy governing age of entry into school, we observed that a higher proportion of underage children participate in school in the two states with a lower age norm for entry into Grade 1.

Age 5 to age 8

The analysis in the remainder of this chapter is restricted to the 7,240 sampled children for whom participation information is available for all 11 waves of the study.[18] Table 4.2 presents the proportion of children in different types of preschools or schools, at successive one year intervals from age 5 to age 8, both overall and by state.

Table 4.2: % Sampled children in different types of preschool or school, by age and state

Age	Participating in preschool			Participating in primary school			Not participa-ting	Total
	Government	Private/ other	Total preschool	Government	Private/ other	Total School		
Assam (N=2126)								
Age 5 (2012)	*76.9*	*16.7*	**93.6**	*5.4*	*1.0*	**6.4**	*0.0*	**100**
Age 6 (2013)	*42.2*	*12.5*	**54.7**	*31.3*	*13.9*	**45.2**	*0.2*	**100**
Age 7 (2014)	*13.2*	*4.1*	**17.3**	*54.9*	*26.5*	**81.4**	*1.3*	**100**
Age 8 (2015)	2.5	*1.1*	**3.6**	*64.4*	*30.9*	**95.2**	*1.2*	**100**
Rajasthan (N=3003)								
Age 5 (2012)	*9.8*	*37.9*	**47.7**	*30.7*	*18.0*	**48.7**	*3.6*	**100**
Age 6 (2013)	*3.1*	*23.1*	**26.3**	*36.2*	*34.5*	**70.7**	*3.1*	**100**
Age 7 (2014)	*0.3*	*10.0*	**10.3**	*36.5*	*50.6*	**87.1**	*2.6*	**100**
Age 8 (2015)	*0.0*	*3.4*	**3.4**	*38.7*	*55.8*	**94.5**	*2.1*	**100**
Telangana (N=2111)								
Age 5 (2012)	*15.9*	*43.3*	**59.1**	*37.8*	*3.1*	**40.9**	*0.0*	**100**
Age 6 (2013)	*1.5*	*27.6*	**29.1**	*53.6*	*17.2*	**70.7**	*0.2*	**100**
Age 7 (2014)	*0.2*	*8.4*	**8.6**	*56.2*	*35.2*	**91.4**	*0.1*	**100**
Age 8 (2015)	*0.0*	*1.7*	**1.7**	*58.1*	*40.1*	**98.2**	*0.1*	**100**
All Children (N=7240)								
Age 5 (2012)	*31.3*	*33.2*	**64.5**	*25.4*	*8.7*	**34.0**	*1.5*	**100**
Age 6 (2013)	*14.1*	*21.3*	**35.4**	*39.8*	*23.4*	**63.2**	*1.4*	**100**
Age 7 (2014)	*4.1*	*7.8*	**11.8**	*47.7*	*39.0*	**86.7**	*1.5*	**100**
Age 8 (2015)	*0.8*	*2.2*	**3.0**	*51.9*	*43.9*	**95.8**	*1.3*	**100**

[16] Government preschools in Assam include both Anganwadis as well as Ka-shrenis, a one year preschool programme offered in selected primary schools across the state. These two institutional spaces have been combined as the number of sampled children in Ka-shrenis was very small.

[17] Although cases of formal school-based participation by younger children have been captured and analysed in the Young Lives India study situated in Andhra Pradesh and Telangana (Streuli et al., 2011)

[18] In addition to attrition from the baseline sample over the four years of the study, there were many cases of children who were located during some fieldwork rounds but not during others.

As expected, as children get older, preschool participation declines and school-based participation increases, both in the sample overall and in individual states. At age 5, about two-thirds of all sampled children were in preschool; this proportion decreases to about one third at age 6 and continues to decrease over time. But data for individual states provide a much more nuanced picture.

Trends in preschool participation at age 5 are driven mainly by children in Assam with over 90 per cent of children in preschool; at the other end of the spectrum, 4 in 10 children in Telangana and 5 in 10 children in Rajasthan were already participating in school. Even at age 6, less than half of all children in Assam were in school compared to over 70 per cent of children in both Rajasthan and Telangana. These data imply that children's exposure to preschool in the latter two states is relatively low in comparison to Assam, where children continue to participate in preschool for several more years.

Despite the RTE Act's clause that children should begin Grade 1 at age 6 and the various state norms that permit entry to school even before age 6, it is only at age 8 that trends in children's participation stabilize and well over 90 per cent of the sample in each state is participating in primary school. Taken together with the finding that in some states, a significant percentage of 4-year-olds are already in school, these data illustrate the enormous problem with the common assumption that children across the country enter the same grade at the same age (Figure 4.1).

In terms of management type, children's participation between age 5 and age 8 remains largely in government institutions, whether in preschool or school. However, once again these broad trends camouflage state level variations (Figure 4.2). For instance, Rajasthan has by far the highest proportion of children participating in private institutions at all ages, rising to over 60 per cent by age 8. In Telangana, the reverse is true: while substantial proportions of children were in private institutions at age 5 and 6 years, this proportion declines over time and by age 8, close to 6 of every 10 children are in government institutions. In Assam, although there is low participation in private institutions throughout, this proportion increases by over fourteen percentage points between age 5 and 8. Clearly, then, what young children do between age 4 and age 8 varies enormously depending on where in the country they live, in terms of both the level and type of institution attended.

Interestingly, children's participation in the early years does not seem to be related to the provisioning of preschools and schools in these locations. For instance, it may be recalled from Chapter 3 that sampled villages in Rajasthan had high provisioning of preschools, both government and private; despite this we find substantial proportions of young sampled children in the state not participating anywhere, especially in the first year of the study.

Figure 4.1: % Sampled children in primary school, by age and state

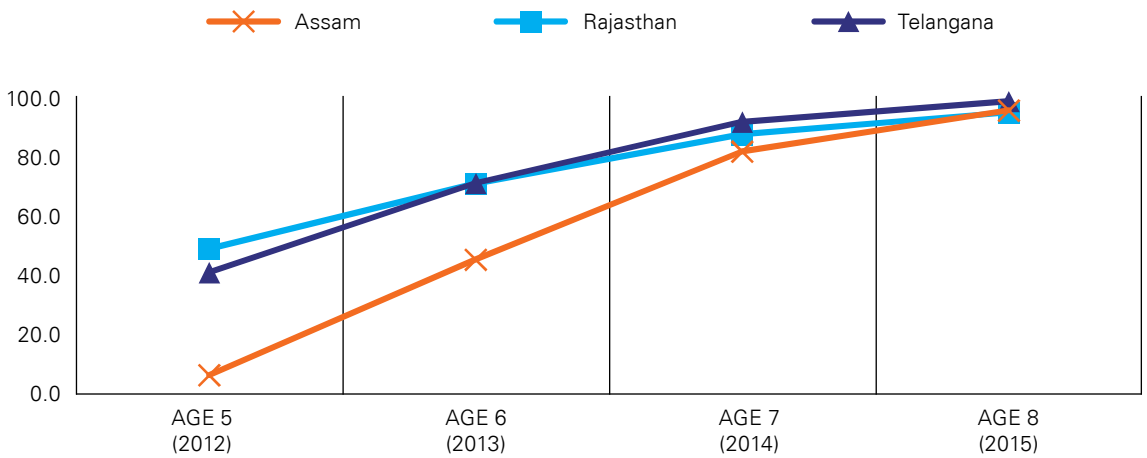
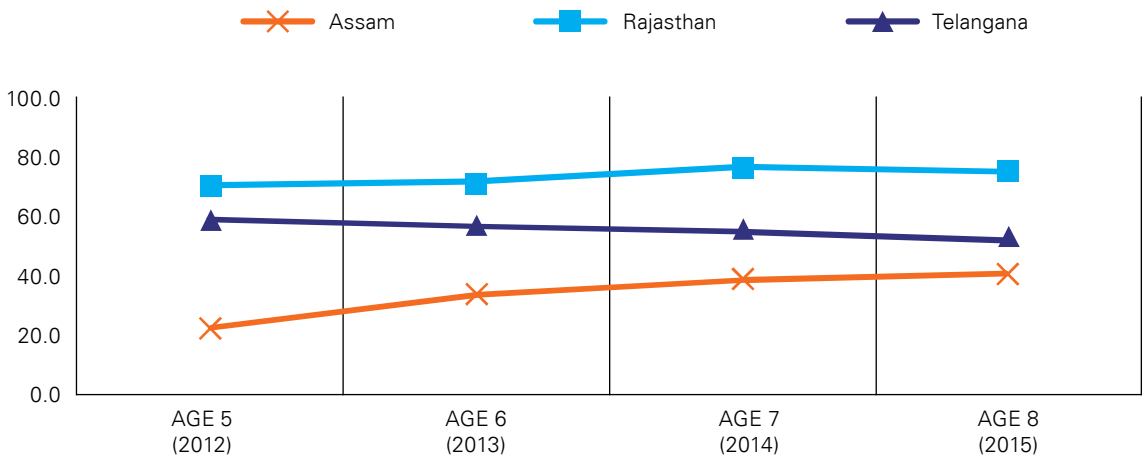


Figure 4.2: % Sampled children in privately managed institutions, by age and state



4.3 Estimating 'exposure': Pathways between preschool and school

As seen in Table 4.2, there is lack of uniformity in how children of similar ages participate in educational settings in different states. In two states, children as young as 4 were already in primary school, whether formally or informally, whereas in the third, children age 7 were still in preschool.

Such variations pose a challenge to the estimation of children's aggregate exposure to preschool or school, without which it is difficult to ascertain the degree to which this exposure impacted their school readiness outcomes. In order to estimate this exposure, we examine children's participation across multiple waves, since participation in educational institutions in India follows academic year cycles, we aggregate children's records from multiple rounds into academic-year blocks.

Table 4.3 superimposes the fieldwork calendar of this study onto the academic-year calendar of each state, and accounts for the differences between these cycles in the three states (in Assam, the academic year extends from January to December; while in Rajasthan and Telangana it runs from June to April). This means that although fieldwork was undertaken concurrently in all three states, sampled children were at different points of progress within their respective academic years. For example, at baseline (September-December 2011), children in Assam who were participating in some institution were at the end of the 2011 academic year cycle, whereas in Rajasthan and Telangana, they were roughly in the middle of the same academic year.

Overall, during the fieldwork period in Assam, sampled children were in the last third of the first academic year (2011), followed by full academic year cycles for 2012, 2013, and 2014 and two-thirds of the fifth academic year in 2015. In Rajasthan and Telangana on the other hand, during the same period of fieldwork, sampled children were in the latter two-thirds of the first academic year (2011-2012), followed by full academic years of 2012-13, 2013-2014, and 2014-2015; and two-thirds of the fifth academic year 2015-2016.

Since the study spans five academic years for the sampled cohort in each state, this framework, despite its complexity, allows us to examine children's cumulative trajectories as well as linearity of participation in finer detail.

Table 4.3: State-wise academic year calendar across the IECEI Study period

Fieldwork Round *	1	2	3	4	6	7	8	9	10	11	12
	Sep - Dec 2011	Feb – Mar 2012	Jul - Aug/ Sep 2012	Sep - Dec 2012	Jul - Aug/ Sep 2013	Sep - Dec 2013	Feb – Mar 2014	Jul - Aug/ Sep 2014	Sep - Dec 2014	Jul - Aug/ Sep 2015	Sep - Dec 2015
Assam	Academic Year I, 2011-2012		Academic Year II, 2012-2013		Academic Year III, 2013-2014			Academic Year IV, 2014-2015		Academic Year V, 2015-2016	
Rajasthan	Academic Year I, 2011-2012		Academic Year II, 2012-2013		Academic Year III, 2013-2014			Academic Year IV, 2014-2015		Academic Year V, 2015-2016	
Telangana	Academic Year I, 2011-2012		Academic Year II, 2012-2013		Academic Year III, 2013-2014			Academic Year IV, 2014-2015		Academic Year V, 2015-2016	

* Data from round 5 is excluded from all analyses

Given that the focus of this study is to explore children's participation in early childhood education programmes and the impact of this participation on their school readiness and subsequent early grade learning, we present findings on sampled children's cumulative trajectories up to the end of academic year II in this section. By this time, sampled children were an average of 5 years old; the majority were still in preschool but would transition to primary school within the next year. Four waves of fieldwork were conducted during this period (Sep-Dec 2011 through Sep-Dec 2012).[19]

Aggregating data across these four waves of fieldwork generates three major participation categories, based on the length and type of children's participation in either preschool or school during this period:

- *Partial participation:* Children who were participating in a preschool or school during 1-3 out of the 4 waves of fieldwork, but were not participating anywhere on at least one occasion during this year.[20]
- *Full Participation (linear trajectory):* Children who were participating on all 4 fieldwork rounds during this period, and who either stayed at the same level (preschool or school) or else progressed linearly from preschool to primary school during this period. This group of children is further divided based on the length of participation in preschool and in school.[21]
- *Full Participation (mixed trajectory)*: Includes children who were found participating on all 4 fieldwork rounds, but whose participation included non-linear pathways. This category includes, for example, children who moved from preschool to primary school and back again during the year.

As shown in Table 4.4, these data reveal sharper state level variations than were observed in the previous analyses. At age 5, more than 8 in every 10 children in Assam had participated in preschool for 4 consecutive waves of fieldwork, spread over two academic years.[22] The corresponding proportion in Rajasthan and Telangana is over forty-five

[19] Data for subsequent academic years are presented in Appendix 4.1-4.3
[20] Interestingly, in this restricted sample, no children remained non-participating across all 4 waves of fieldwork.
[21] This analysis only focuses on grade level transitions, that is, from any preschool grade to any primary school grade or the reverse. It does not take changes in educational institutions into account.
[22] Note that for the first academic year, the full participation category in Assam has only one point of observation compared to two in Rajasthan and Telangana. Thus, while there may be a difference in the calculation of 'full' participation for the 1st academic year, over the reporting period of two academic years, full participation in all three states is the same and refers to participation on all four visits.

Table 4.4: Children's participation in preschool and/or school between age 4 and age 5, by state

State	N	Partial participation	Full participation:				Total
			Two years of preschool	One year of preschool + one year of school	Other mixed trajectory	Two years of primary school	
Assam	2,126	6.5	85.9	0.0	7.6	0.0	100
Rajasthan	3,003	22.0	30.2	20.4	15.7	11.7	100
Telangana	2,111	6.5	39.1	25.3	23.5	5.6	100
All Children	**7,240**	**12.9**	**49.2**	**15.8**	**15.6**	**6.5**	**100**

percentage points lower, at 30 per cent and 39 per cent respectively. In the latter two states, by age 5, about 20 per cent of children had spent one year in in preschool followed by a year in primary school.

More importantly, this analysis reveals large proportions of children following trajectories that are non-linear and fragmented ('mixed trajectories'), entailing back and forth movements between preschool and school grades. Such cases account for almost a quarter of all children in Telangana and about 15 per cent in Rajasthan. The proportion of the sample with this kind of fragmented trajectory only increases in each subsequent year of the study.

Worryingly, even at age 5, non-trivial proportions of children in Telangana, and particularly in Rajasthan, had already had two consecutive years of exposure to primary school. As noted earlier, it is possible that these children were not formally enrolled in school during this period; nevertheless, these children were clearly far too young to experience prolonged exposure to institutional environments that were by any measure completely inappropriate for their age and stage of development.

Children with 'mixed' participation trajectories

As seen above, at age 5, a substantial proportion of children in all three states have trajectories that are non-linear and far more complex, involving back and forth movements between preschool and primary grades. These proportions only increased with each additional year of the study, such that by age 8, as many as 3 out of every 10 children in the sample had experienced this kind of irregular movement at least once.

Closer examination of these data suggests that these children experience out-of-turn or middle-of-the-year demotions or promotions in grade. For example, in the first three months of the academic year cycle, a child could have been found in Grade 1 and in the following visit would be back in a preschool grade. At the end of the first two academic years covered by the study (Sep-Dec 2011 through Sep-Dec 2012) 1,129 children had this 'mixed' participation trajectory. As Table 4.5 shows, most children with these irregular trajectories were located in Rajasthan and Telangana and had participated mainly in privately managed institutions,[23] suggesting that children in private institutions may be more likely to have received either an out-of-turn demotion or promotion between preschool and primary grades.

A preliminary inquiry into possible reasons behind this trend was undertaken in 2013, with field investigators discussing the issue with parents and centre/school authorities. This inquiry revealed a plethora of reasons behind such movements. In many cases parents reported that children who had previously studied in government institutions were

[23] The exception, Assam, had a low proportion of children with 'mixed' trajectories and fewer children participating in privately managed institutions overall.

Table 4.5: % Children age 5 by number of exposures to government and private institutions (children with 'mixed' trajectory after two academic years)

Exposure category	N	4 Private	1 government + 3 private	2 government + 2 private	3 government + 1 private	4 government	Total
Assam	162	3.7	2.5	8.0	7.4	78.4	100
Rajasthan	471	59.5	7.6	8.7	7.4	16.8	100
Telangana	496	39.1	16.3	14.3	13.3	16.9	100
All Children	**1,129**	**42.5**	**10.7**	**11.1**	**10.0**	**25.7**	**100**

enrolled in a lower grade when joining private school. In other cases, teachers reported holding back or promoting children in the middle of the academic session based on individual learning levels or even due to non-payment of fees.

The analyses in this chapter have focused on the first full year of fieldwork for this study, encompassing two academic years. The differences between states become even sharper when cumulative participation trajectories are analysed over additional academic years (Appendices 4.1-4.3). Children in Assam participate in preschool longer than their counterparts in the other two states; while in the latter, substantial proportions of children have a single year of preschool exposure followed by school. By the end of the study, large proportions of children in each state were observed to follow irregular and non-linear 'mixed' trajectories.

4.4 Do different kinds of children have different trajectories?

To conclude this chapter, we explore the correlates of the observed participation pathways summarized above. For example, do boys in the sample participate differently than girls, and if so how? Do household characteristics such as mother's education and affluence as measured by a household asset index, correlate with children's pathways in the early years?

Gender

Gender differences in the participation trajectories of school going children in India have been amply documented over the years, with larger proportions of boys than girls attending private institutions. These trends are visible in the case of preschool-aged children as well, confirming that gender discrimination begins very early in a child's life.

Table 4.6: % Children in different types of institutions, by age and gender

	Government	Private/Other	Not participating	Total
Boys (N = 3305)				
Age 4 (2011)	53.2	35.3	11.6	100
Age 5 (2012)	50.2	48.6	1.2	100
Age 6 (2013)	46.8	52.0	1.2	100
Age 7 (2014)	44.5	54.3	1.2	100
Age 8 (2015)	45.1	53.8	1.1	100
Girls (N = 3184)				
Age 4 (2011)	60.2	28.5	11.3	100
Age 5 (2012)	59.1	39.0	1.9	100
Age 6 (2013)	57.6	40.9	1.6	100
Age 7 (2014)	56.2	41.9	1.9	100
Age 8 (2015)	58.0	40.7	1.4	100

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Table 4.6 presents participation trends by gender, age and management type over the five years of the study. At ages 4 and 5, although high proportions of both boys and girls attend government rather than private institutions, in each case, the fraction of boys going to private institutions is much higher than that of girls. From age 6 onwards, when increasing proportions of the sample began participating in primary school – the majority of boys went to private institutions while most girls continued in government institutions.

These data confirm trends from other studies showing higher private school participation for boys, indicating greater parental motivation for expenditure on the education of boys than girls (Drèze & Kingdon, 2001; ASER Centre, 2011-2017; Bhattacharjea et al., 2011). The relatively high proportion of boys participating in privately managed institutions is also reflected in children's cumulative trajectories. At age 5, after roughly two academic years, boys were slightly more likely to have followed the non-linear 'mixed' trajectory more commonly associated with private rather than government institutions.

Household characteristics: affluence and mother's education

The influence of household characteristics on children's educational outcomes is well documented in many empirical studies, in India and elsewhere. In Table 4.7 and Table 4.8, we examine linkages between sampled children's cumulative participation pathways at the end of two academic years with two household-level characteristics, namely household affluence (measured by a consumer durable ownership/asset index[24]) and mother's education.[25]

[24] The household asset index was created from information collected during the household survey, which included information on durable assets owned by the household. The index includes 7 consumer durables – telephone, fan, TV, cycle, scooter, refrigerator and car. The ownership of each item was awarded a point of 1, generating an index that can take values from 0 to 7. This was split into three categories – low, medium and high with each corresponding to index values of 0-1, 2-3, and 4-7 respectively. The sample distribution for this indicator is as follows: 26.2 per cent children were from 'Low' asset category households, 44.1 per cent were in 'Medium' asset category households and 29.7 per cent households were in 'High' asset category households. See detailed state wise distribution in Appendix 4.4.

[25] Mothers were divided into three groups based on their reported education levels. Category 1 has mothers with no schooling, Category 2 has those who had some primary school education (between Grades 1-5) and category 3 includes those who had more than primary school education (Grade 6 or more). 48.0 per cent of all mothers in the study had no schooling, 16.7 per cent mothers had some primary school education (between Grades 1 to 5) and 35.3 per cent mothers had schooling above primary school. However, there are major inter-state variations. See detailed distribution in Appendix 4.5.

Expectedly, household affluence has strong linkages with whether sampled children participated in government or private institutions. Children from poorer households (those in the 'low' asset index category) were far more likely to be participating in government institutions. At each age, between twenty and forty percentage points more children from 'medium' and 'high' asset households respectively, participated in private institutions. Similarly, at each age, higher proportions of children from households categorized as 'low affluence' were not participating anywhere. Similar patterns also emerge for the relationship between mother's education and children's participation, although the differences between groups are less stark.[26]

To summarize, we see that children's participation trajectories differ by gender, household affluence as well as mothers' education levels even at relatively young age. However, this is a bivariate analysis without controls; Chapter 6 examines these linkages in greater detail in a multivariate framework.

Table 4.7: % Sampled children in different types of institutions, by age and household asset index

	Government	Private/Other	Not participating	Total
Low asset (N=1,559)				
Age 4 (2011)	78.9	11.9	9.2	100
Age 5 (2012)	79.8	18.4	1.8	100
Age 6 (2013)	74.8	23.3	1.9	100
Age 7 (2014)	70.9	26.2	2.8	100
Age 8 (2015)	71.5	26.4	2.2	100
Medium asset (N=2,524)				
Age 4 (2011)	55.5	34.7	9.8	100
Age 5 (2012)	52.7	45.4	1.9	100
Age 6 (2013)	51.0	47.4	1.6	100
Age 7 (2014)	50.5	48.0	1.6	100
Age 8 (2015)	51.9	46.7	1.4	100
High asset (N=1,790)				
Age 4 (2011)	39.2	51.8	9.0	100
Age 5 (2012)	31.5	67.3	1.2	100
Age 6 (2013)	30.7	68.4	1.0	100
Age 7 (2014)	29.7	70.1	0.3	100
Age 8 (2015)	30.8	68.7	0.5	100

[26] These patterns also seem to be linked to state level differences and require further exploration to tease out nuances. For instance, Rajasthan and Telangana which have higher proportions of illiterate mothers also have a lower age bar for entry into Grade 1 (5 years). As evidenced by data in this chapter, children in these states begin school earlier and have lower exposure to preschool. Assam on the other hand, which has a higher proportion of mothers with primary education or above, and a higher age of entry into school is where we also observe sampled children remaining in preschool institutions for longer periods. Additionally, it is important to note that the indicators of household asset index and mothers' education are also highly correlated.

Table 4.8: % Children in different types of institutions, by age and mother's education

	Government	Private/Other	Not participating	Total
Mothers with no schooling (N=2,646)				
Age 4 (2011)	61.5	24.8	13.7	100
Age 5 (2012)	62.7	34.6	2.7	100
Age 6 (2013)	61.3	35.9	2.8	100
Age 7 (2014)	59.5	37.9	2.7	100
Age 8 (2015)	60.2	37.7	2.1	100
Mothers with some primary school education (N=970)				
Age 4 (2011)	61.7	30.0	8.4	100
Age 5 (2012)	59.6	39.0	1.4	100
Age 6 (2013)	57.5	41.9	0.6	100
Age 7 (2014)	56.1	43.3	0.6	100
Age 8 (2015)	57.5	41.7	0.8	100
Mothers with more than primary school education (N=2,074)				
Age 4 (2011)	48.3	47.1	4.6	100
Age 5 (2012)	38.1	61.4	0.5	100
Age 6 (2013)	34.8	64.9	0.3	100
Age 7 (2014)	34.4	65.3	0.3	100
Age 8 (2015)	35.7	64.1	0.1	100

4.5 Concluding thoughts

The data presented in this chapter show that there is no national or uniform pattern of preschool and primary school participation among young children in India. Children in each of the three states covered by this study have distinct trajectories from preschool to school.

More worryingly, we find that participation among 4- and 5-year-old children is not limited to preschool. A significant proportion of children in two of the three states begin participating in school at the age of 4, whether formally (enrolled in school) or informally (physically participating but not officially enrolled). These differences highlight the need to bring convergence across national and sub-national policies governing educational development of children in India. While the impact of these different participation trajectories on children's learning levels is examined in Chapter 6, it is important that these trends be acknowledged by policy makers and practitioners at various levels in order to ensure that children are in age and developmentally appropriate institutions.

The evidence on children's pathways also suggests that parents in different states make different decisions regarding their children. It is imperative that not only policy makers and practitioners, but equally parents and caregivers understand the importance of appropriate early childhood care and education opportunities for their children which can stimulate cognition and curiosity. Parents should not look at the role of early childhood education as limited to introducing children to formal teaching and learning at an early age. This will perhaps help prevent the "multiple and fragmented pathways" (Streuli, Vennam and Woodhead, 2011) that seem to be followed by many children.

Chapter 5

Assessing quality in preschool and early primary grades

Chapter summary

How was quality assessed?

The findings reported in this chapter are based on classroom based observation of 298 preschools and 397 primary schools across public, private and voluntary sectors, in the three states of Assam, Rajasthan and Telangana. These primarily included Anganwadis and private preschools attached to composite schools at the preschool level and government and private schools at the primary stage. In addition, a very small number of 'known practice centres' were included in each state, which had been purposively sampled to ensure variance in quality.

The main domains for assessment included (i) physical infrastructure (ii) play and learning materials (iii) nature of curricular transactions (iv) classroom composition, management and organization and (v) teacher characteristics and disposition. The benchmark of developmentally appropriate practice against which the assessment was carried out is described in the chapter.

Major findings

The three main models of preschool education – Anganwadis, private preschools and known practice centres – were compared in detail on each of the identified domains. Whereas the two main models, – Anganwadis and private preschools – each have a few elements of good practice, overall, neither is found to be developmentally appropriate for children. On the other hand, one of the known practice programmes assessed provides a potentially 'good practice' model for disadvantaged communities.

Some key attributes of a good quality preschool that emerge from the analysis are availability and use of play and learning materials, classroom management and organization, democratic classroom environment and an interactive teacher. Formal teaching of the 3R's in preschools has a negative relationship with developmentally appropriate activities. An important learning is that there is a close interdependence between and among activities for different developmental domains, indicating the need for an activity-based approach with activities nurturing multiple domains rather than the conventional approach of planning for each domain separately.

While the quality of preschool programmes is a concern in its own right, a related concern is the similar trend in formal, developmentally inappropriate pedagogy continuing along the entire early learning continuum in the primary grades. This raises the issue of the lack of quality and child centeredness of the entire foundational stage of education, which may be a key factor behind the cumulative deficit in school learning outcomes visible in India today.

5.1 Introduction

One positive takeaway from the previous chapter is that access to preschool and primary programmes is not a major issue in the three study states, as most sampled children were participating in one or the other programme from age 4 onwards. In this chapter, we examine the quality of education being offered to sampled children in these early, critical years of life, through the various educational facilities available to them.

Since the quality assessment of programmes required a more in-depth and comprehensive inquiry, the data reported in this chapter are based on the smaller Strand B sample of this study, which focused on the assessment of a sample of 'community preferred' facilities at both the preschool and the early primary school stage. A 'community preferred' programme is operationally defined as any preschool or school in a sampled village which at least 3 to 5 children of the target age group were attending. These institutions were purposively selected, using the 'follow the child' principle, with the assumption that this criterion would ensure that (a) such centres reflect the community's understanding of better (or more preferred) centres for their children, thereby (b) allowing for the inclusion of only functional centres to be assessed on quality dimensions and (c) translating into variation in scores for the purpose of analysis. Since children attending these facilities had to be tracked and assessed individually in order to analyse the association between quality dimensions and children's learning outcomes, this was considered to be a more cost effective approach. Using the above principle and based on the programmes attended by sampled children in this strand between ages 4 – 7 years, the following programmes were selected for an assessment of quality (Table 5.1).

Table 5.1: Distribution of assessed preschools/schools attended by 4 - 7-year-olds (Strand B sample)

Age	State	Preschool programme			Primary school programme			
		Anganwadis	Private preschools	'Known practice' preschools	Government schools	Private schools	'Known practice' schools	Total sample
4 years	Assam	101	10	6	0			117
	Rajasthan	10	33	9	2			54
	Telangana	54	54	13	6			127
	Total	165	97	28	8			298
5 years	Assam	1	41	9	69	15		126
	Rajasthan	9	38	6	27	18	1	108
	Telangana	32	72	8	49	1		162
	Total	42	151	23	145	34	1	396
6 years	Assam	1	6	3	95	47		152
	Rajasthan	5	18		35	44	6	108
	Telangana	1	21	2	56	55		135
	Total	7	45	5	186	146	6	392
7 years	Assam			1	98	54		153
	Rajasthan	3	6		39	71	6	125
	Telangana		5		54	75		134
	Total	3	11	1	191	200	6	412

'Known practice' in Rajasthan: An example of a community owned model

The 'known practice' model in Rajasthan caters specifically to communities with low school enrolments. The process starts with a survey of the targeted community focusing on the educational level, needs and requirements of the community. Opinion leaders within the community are then involved in spreading awareness among others with the focus of the awareness programme centred on the importance of education, specifically in the early years. When the organization and community decide to work together for the education of children, they set up a school in equal partnership. From conception to actual day-to-day running of the school, responsibilities are shared by the agency and the community.

Education is free for children, but the management, administration and other costs of the school are taken care of by the community and the NGO together. Annual contributions towards the school costs are made by every family in the community and children from the community go to other schools only after completing primary school. If any child from another community wants admission in this school, the decision is taken by the community itself.

The types of programme attended by 4- to 7-year-olds include Anganwadis, private schools, government primary schools and a handful of 'known practice' programmes (preschools/schools).[27]

'Known practice' programmes: One of the two districts in each state included in the study was purposively selected because of presence of a 'known practice' programme, which was included in the Strand B village sample to ensure variance in programme quality. 'Known practice' refers to programmes that were well-known in the early childhood sector but whose quality had not been examined. The selected 'known practice' programmes varied in content and structure across the three states.

- In Telangana, the selected 'known practice' programmes were the *Balwadis* (preschool centres) for children between 3 to 6 years that were part of a state government sponsored programme for rural and tribal communities.
- In Rajasthan, the 'known practice' programme comprised community primary schools with preschool sections for disadvantaged children run by an NGO known for its innovative educational programmes.
- In Assam, the known practice was an initiative of the Department of Education under its flagship programme, Sarva Shiksha Abhiyan (SSA), wherein a preschool class for 4- to 5-year-olds was attached to selected government primary schools as a preparatory class, prior to Grade 1.

However, when the study began, it was realized that the *Balwadi* programme in Telangana had been merged with the Anganwadis and had lost the characteristics that distinguished it as a 'known practice' programme. Similarly, the preschool classes run as part of the government primary school in Assam had no provision for a separate teacher, and preschool children were seen either attending primary grades or spending time in the Anganwadis which were often located in the same campus, and did not provide an alternative model of preschool. Thus, in this chapter 'known practice' refers to only the Rajasthan model.

This chapter presents findings on quality variations of 3 preschool and 3 primary school programmes attended by sampled children in Strand B (Table 5.1). While these findings cannot be generalized for particular segments of preschools or schools, they nevertheless reflect the quality of institutions that children in this strand of the study attended and were exposed to. Along with presenting findings from the quality assessment, we also bring in key learnings from the third strand of our research, the nine case studies of preschool education programmes across

[27] The first three categories of programmes were described in Chapter 3.

several states in India (Bihar, Gujarat, Maharashtra, Karnataka, Uttarakhand and including study states Telangana and Rajasthan), to derive a more nuanced and in-depth understanding of some essential ingredients of a high-quality preschool programme.

Tools for Assessing Quality of Facilities

The programmes attended by children were assessed using two observation-based rating scales - the Early Childhood Education Quality Assessment Scale (ECEQAS), and an extended version of this scale for early primary grades, the Early Childhood Education Quality Assessment Scale Plus (ECEQAS Plus).[28] Both tools were developed by CECED, Ambedkar University Delhi. The ECEQAS was used for the baseline assessment phase of the study when the sampled children were 3.5 to 4.5 years old, and the ECEQAS Plus was used when children were ages 5, 6 and 7 years to estimate the quality of programmes attended by the children at that age.

Benchmark for 'good practice' in ECE: The rating scales are theoretically derived from a child development and social constructivist perspective, which advocates for a developmentally and contextually appropriate curriculum built on a child-centred, as opposed to a teacher centred, pedagogy in fulfilling the objectives of early childhood education. As discussed in Chapter 1, these are to provide for a strong foundation for all round development and lifelong learning in the early childhood years and also to prepare children for schooling. In consonance with this framework, the assessment tools rate a curriculum meeting these two objectives as a 'good practice'. This would include a curriculum that addresses the different domains of development (language, cognitive, socio-emotional, physical and motor skills and creativity) through a play-based and age and contextually appropriate pedagogy using local resources. In addition, it would include a component of school readiness, particularly for children between 4 to 6 years of age, with specific experiences and activities to help children develop requisite readiness for learning to read, write and do mathematics later in school. Good practice would therefore not reflect formal teaching of the 3R's. This curriculum would be facilitated by adequate and safe physical infrastructure and a caring teacher who has been specifically trained in early childhood care and education.

Since the global definition of early childhood now extends up to 8 years of age, it is expected that the basic principles on which early curricula and pedagogy are based should extend in upward continuity to the early primary stage as well. The readiness component of the curriculum should allow for a smooth transition into the learning of the 3R's in terms of early literacy and numeracy, following a similar pedagogical approach throughout the early years. These attributes, if present in a programme, qualify it for a higher score on the ECEQAS Plus tools.

In this chapter, we present data to illustrate sampled children's experiences in the preschool and primary school stages of education, both critical foundational stages for all learning. We compare findings from the assessment of four quality domains in a comparative mode across different kinds of preschool and primary school programmes. These include (i) physical infrastructure, which is the most easily observable aspect of quality, (ii) the nature of curricular transactions, (iii) how classrooms are managed and organized by the teacher, as well as (iv) the teacher's characteristics. We also explore how preschool and primary school curriculum interface with each other and the extent to which preschool prepares children for the primary stage of education.

5.2 Preschool programmes

As reported in Chapter 4 for the larger Strand A sample, the majority of sampled children in Strand B were also observed participating either in Anganwadis, which were found in every village, or in preschool grades of private schools. Additionally in the Strand B sample, a small proportion of children were also attending the known practice programmes described above in each state. For reasons discussed earlier, only the Rajasthan NGO programme is included in this analysis as a third model. The section below briefly discusses the quality dimensions[29] of these three different types of programmes.

[28] The domains and indicators studied as part of ECEQAS are presented in Appendix 5.1 and a similar explanation on ECEQAS Plus is provided in Appendix 5.2.
[29] The distribution of preschool programmes scoring maximum rating on different ECEQAS indicators is provided in Appendix 5.3

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Physical infrastructure

Adequacy, cleanliness and safety are the key ingredients of a desirable space for children, given their need for protection, physical movement and group work.

In this context, most Anganwadis in the three states were found to have limited infrastructure. Typically, Anganwadis were running from rented accommodation, while others operated from primary school campuses or in a separate room allocated on the outskirts of the village. Some differences were evident across states. A higher proportion of Anganwadis in Rajasthan had their own buildings, which were built on the outskirts of the village on Panchayat land, although these centres were not necessarily located in safe surroundings. Inadequacy of space was found to be a major limitation; almost 50 per cent of these centres did not have enough space for children and the Anganwadi worker to move around freely, let alone conduct group activities. About 54 per cent of Anganwadis did not have proper seating facilities, with children observed sitting on torn mats or on a bare floor. Basic amenities such as toilets were rarely available, and in most cases children were observed to be using open spaces.

In contrast, the known practice preschool programme in Rajasthan – though also built on unclean sites on land donated by the community on the outskirts of the hamlet – was spacious and had well ventilated classrooms for children. The children sat on clean mats and the classroom space was kept clean. However, this programme too in most cases lacked toilets for children, as well as infrastructure for children with special needs.

In comparison, private preschools were located in less hazardous areas and cleaner surroundings, as these buildings were customized in terms of design to function as schools. However, in Rajasthan, private preschools were often located in old and dilapidated *havelis* and were, therefore, not physically safe for the children. About two-thirds of these schools had limited space for children to sit properly, let alone move around, and in about a third of these schools,

children sat on bare floors or on mats. Across the sample states, all but one school lacked basic infrastructural facilities required – particularly for access such as railings and/or ramps – for children with special needs. As a result, very few children with special needs were seen in the preschools across the states.

Outdoor space, play and learning environment

Outdoor play is a key requirement for young children to promote their gross motor development and for their overall physical well-being. It also nurtures social interactions and enables children to learn to be team players. Forty-two per cent of Anganwadis, however, had no open space available for children. The situation in Rajasthan was somewhat better, where nine of the ten centres had space, although no play equipment. In most cases, the known practice centres also had outdoor space but none were observed to have any equipment. Most private schools were situated in sites which had very limited outdoor space and no outdoor play equipment, except in a few schools in Telangana and Assam. Children were thus restricted inside rooms and not allowed to move out and play with their peers.

Indoor play facility

With regard to the availability of indoor play material, Anganwadis had an edge over private schools across the sample states, since such material is provided as part of the preschool education kits by ICDS. However, although about 64 per cent of Anganwadis had some indoor play material, it was insufficient in quantity and therefore rarely seen in use. Among private preschools, only 3 per cent of private preschools in Telangana and 20 per cent in Assam were observed to have manipulative material for children. In contrast, the known practice programme in Rajasthan had a variety of low cost and teacher-made materials available in sufficient quantity for engaging children in concepts related to play activities, although the extent of their use varied across centres.

Classroom composition, management and organization

A well balanced and age appropriate ECE programme which is child-centred and caters to all domains of development requires an optimal adult-child ratio, appropriate and regular planning on a daily/weekly basis and classroom management. The centres were observed through this lens.

Class composition and adult-to-child ratio: The National ECCE Policy (2013) prescribes an adult-to-child ratio of 1:20 as the quality standard. Using this as a reference, the adult-child ratio in Anganwadis was found to be positive in Telangana and Rajasthan with more than two-thirds of the all centres having less than 25 children per two adults (Anganwadi worker and a helper). This may be a consequence of the high participation of children from the catchment area of each Anganwadi in private preschools in these two states. In Assam which had limited private provisioning, Anganwadis were found to be more crowded with about 30 to 40 children per centre. Private preschools across all states were found to be overcrowded with more than 50 children to a class and an adverse teacher-pupil ratio. On the other hand, the known practice centres had a favourable adult-child ratio with less than 25 children with one teacher.

Class composition: As per the ICDS design, an Anganwadi worker is expected to work with children between ages 3 to 6; thus, Anganwadis were invariably observed to have a mixed composition of children in the age range of 2 to 6 years, with a larger proportion of younger children. Private preschools in Assam and Telangana had more homogenous age-wise groupings in preschool grades with one teacher per class/age group. In Rajasthan, private preschools were multi-grade with children of varying ages and abilities sitting in a class with a single teacher in most (90 per cent) cases. Private school teachers in Rajasthan were observed teaching a common lesson to all, irrespective of their age or level. While the known practice programme was also observed to have a mixed age group, the class was divided into two groups according to their age and the teacher rotated between them with age appropriate activities.

Classroom display: In most cases, Anganwadis across the states were observed to be decorated with display material, some supplied by the state ICDS; however, these were often not relevant to children, but were more for the benefit of the community. In 69 per cent of cases, where material

relevant for children was displayed on the walls, it was found to be much above the eye level of the children. Preschool classrooms in private schools rarely had any displays - only 13 per cent private preschools had some displays on the walls and only 1 per cent had children's artwork displayed. This observation was consistent across states. In the known practice programme, classrooms had interesting and relevant charts and pictures displayed on the walls for children and at their eye level.

Classroom organization and management: A child centred or developmentally appropriate classroom for ECCE is one that allows for a flexible, balanced programme which has a mix of individual, small and large group activities that promote different developmental domains and allow children to physically move from one activity to another. State differences were evident in terms of such classroom practices. While overall there was very little evidence of a planned or flexible classroom organization, the anganwadis in Telangana emerged as a relatively better practice in comparison to those observed in Assam and Rajasthan. Anganwadi workers in Telangana were more likely to organize a mix of individual, group, or whole class activities, demonstrating a flexible classroom arrangement, as per the requirement of the activities planned.

As many as 43 per cent of private preschools were also observed be following a weekly schedule with a subject wise timetable, thus reflecting a planned approach to curriculum transaction. However, these planned activities were, in most cases, related to formal teaching of reading, writing and numbers, which is not considered good practice at the preschool stage. In seven out of the nine known practice centres visited in Rajasthan, teachers followed a pre-planned weekly and daily schedule, taking into consideration the age and abilities of the children. Pre-group sections had a flexible classroom arrangement which was adjusted according to the activities.

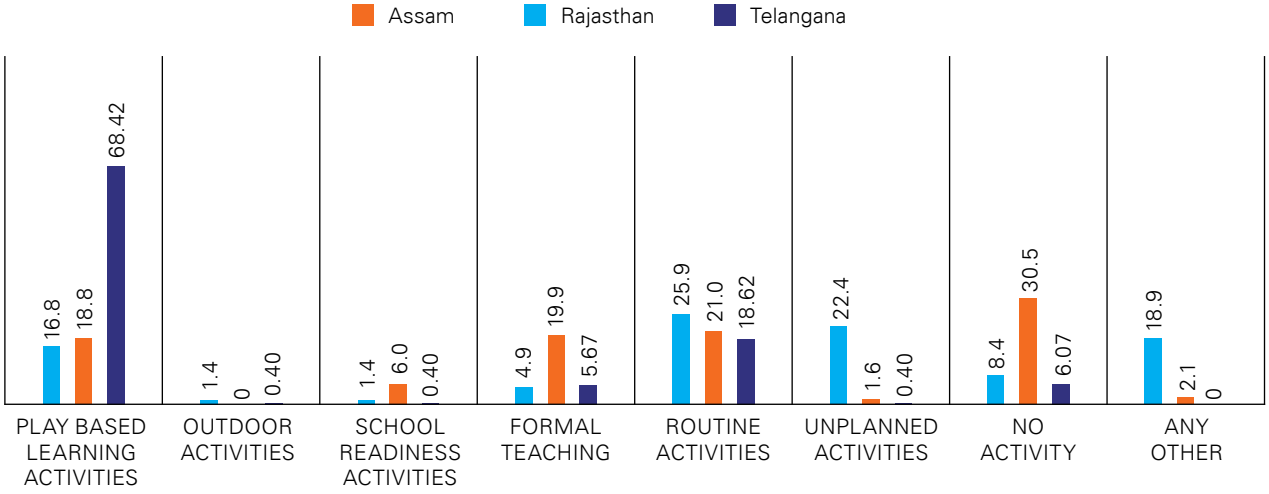
Curricular transaction

Time on task analysis: The essence of quality in any educational programme is determined by its curriculum and how it is transacted. As mentioned earlier, the expectations of a developmentally appropriate preschool programme, as derived from theory, set the benchmark, against which the practices were observed in this study. In order to estimate how time was being spent by children in different programmes, a time on task analysis was carried out. All activities observed in different programmes were categorized into five main groups. *Play based learning activities* included free and guided conversation, storytelling, songs and rhymes, dramatization, free and guided play, clay work, colouring, pasting, circle time and so on. Activities for pre-reading, pre-writing and pre-number concepts were clubbed together and grouped as *school readiness activities* while the teaching of the 3R's through rote memorisation and copying from the board or text book was categorized as *formal teaching.* Activity for gross motor development outside the classroom is represented as *outdoor play* while *routine activities* include attendance taking, distribution of food, cleaning of the classroom and similar activities. Children sitting idle in the class and not involved in any activity planned by the teacher was categorized as *no activity.*

Based on the above, the classroom observations of 165 Anganwadis indicate that children in these centres spent a significant quantum of time doing nothing but sitting around, with no planned activity happening as shown in Figure 5.1. Additionally, a lot of time was spent on routine activities such as room cleaning, register work, meal preparation and distribution. One of the main concerns was the absence of school readiness activities and a very low incidence of play activities, particularly outdoor play, although play is the main medium of learning for children at this stage. To a certain extent, Anganwadis in Telangana were an exception, where in a significant percentage of Anganwadis, time was spent on play based learning activities (although there was some imbalance in favour of language activities like songs and rhymes in a whole class mode, and less of storytelling and theme based conversation).

Activities for the development of cognitive skills and concepts were rarely observed, as children were seen to be involved in more formal teaching-learning of the 3R's, as a downward extension of the primary school curriculum. Opportunities for development of creativity, fine motor development and free play activity, all of which are part of the core of an ECCE curriculum, were rarely observed except in a few cases in Telangana. One reason for this shortfall

Figure 5.1: % Time spent on different activities in Anganwadis, by state



might be the lack of a recurrent grant to Anganwadis for raw materials and resources required for activities such as stationery, colours, story books, imaginative and manipulative toys.

The private preschools observed did not follow a defined curriculum at the preschool stage as there is no such prescription from relevant state education boards. Our interactions with school personnel indicated that they had no understanding of an appropriate preschool curriculum and instead conveyed a vague understanding that children needed to spend 2 to 3 years in preschool before entering Grade 1. Consequently, these preschool classes were a downward extension of primary classes with the curriculum largely focusing on formal teaching of alphabets and numbers (Figure 5.2). Very little emphasis was observed on providing developmentally appropriate classroom practices such as planned listening and speaking opportunities to develop children's language skills, the development of eye, hand and fine-motor coordination, or activities for concept formation and development of cognitive skills.

Private preschools in Assam were comparatively more inclined towards these developmentally appropriate practices as compared to the other two states, as can be evidenced from Figure 5.2 in which they demonstrate less time spent on formal teaching of the 3R's and a higher percentage of time on play based activities and school readiness activities.

Figure 5.2: % Time spent on different activities in private preschool grades, by state

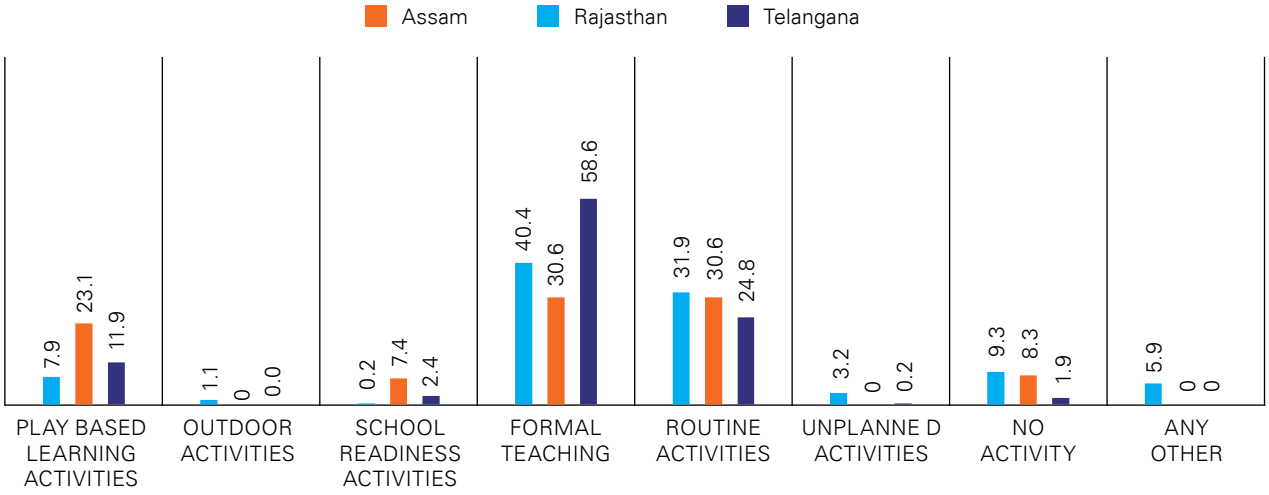
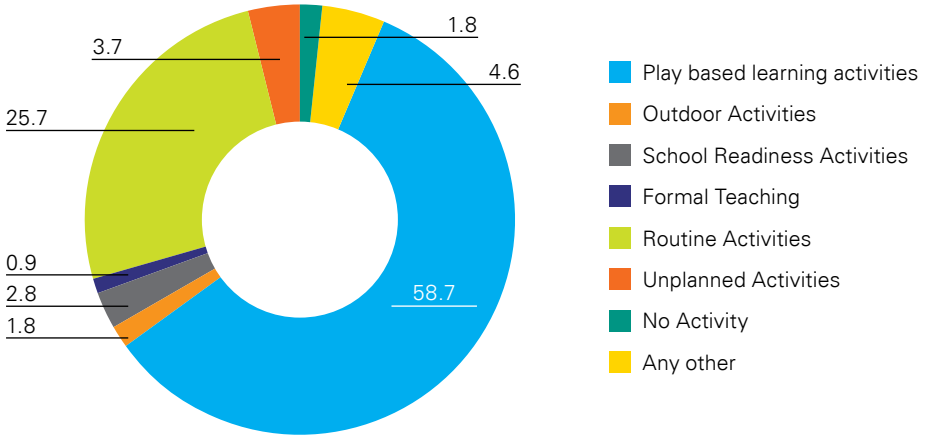


Figure 5.3: % Time spent on different activities in known-practice preschools

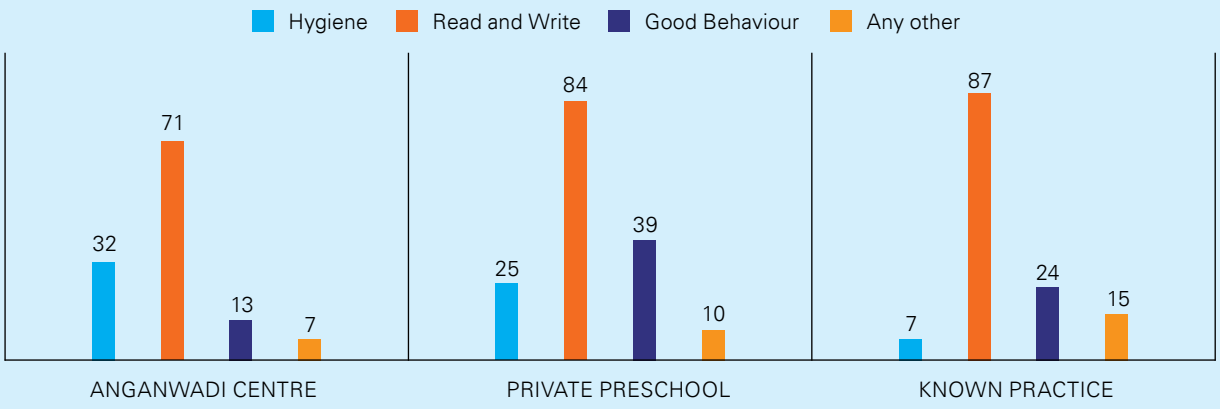


The known practice programme from Rajasthan was observed to have a more developmentally appropriate curriculum for children, with a focus on language and cognition - 58.7 per cent of the classroom time in these programmes was spent on play based learning activities (Figure 5.3). Several opportunities and activities for concept formation, development of conceptual skills and readiness activities had been designed for the children. Overall, children in these programmes had little exposure to formal reading, writing and arithmetic and had a greater focus on school readiness.

How should children spend time in preschool programmes – parents' views!

At baseline, parents of sampled children were interviewed to understand what they expected their children to learn in preschools. As is clear from Figure 5.4, irrespective of the programme being attended, parents primarily expected that children learn to read and write in preschool. Good behaviour like hygiene and learning to sit still in one place or obeying commands were some of the other attributes associated with preschool but in far fewer numbers. Habits and skills related predominantly to academic learning were the priority for parents, irrespective of the category of preschools the children were being sent to.

Figure 5.4: Parents' understanding of what children should learn in preschool (in percentage), by type of preschool attended



Observations from the study also indicate that teachers in the known practice centres provided adequate time for supervized free play, over the course of which they interacted with children. The combination of supervized free and guided play was observed to give children the freedom to choose their material and activity, while the teacher could use that time to work with a smaller group of children by rotation to develop their conceptual understanding through guided activities, using the activity material.

Anganwadi worker/Preschool teacher

In most cases, both Anganwadi workers and private preschool teachers were found to be from the local area, though not necessarily from the same community. In terms of educational qualifications, most Anganwadi workers had completed secondary schooling, while about 12 per cent were graduates. The teachers in the other two kinds of programmes were better qualified. Private schools did not have designated teachers for preschool grades and primary grade teachers taught at this level as well. About two-thirds of these teachers were graduates and above, and very few had only secondary or less than secondary level education. Teachers in the 'known practice' schools were hired from the community itself and about 95 per cent of teachers had academic qualifications above the secondary level. Of these, about 28 per cent had completed graduation or post-graduation.

About 90 per cent of the Anganwadi workers reported receiving job training, and in some cases refresher training as well, from the Anganwadi Workers Training Centres. Only about 11 per cent mentioned that they had not received any training. However, it should be noted that the one-month-long job training and one week refresher training in ICDS addresses all six services of the ICDS including health, nutrition, preschool education and community participation, of which about four days in the job training and one day in the refresher training are devoted to preschool education. Thus, the duration of training is itself highly inadequate to enable these workers to transact a good quality preschool programme.

Among private school teachers, lack of appropriate training in preschool education was a common limitation. This was evident in their classroom interactions, which were observed to be very formal and teacher centred. While some schools claimed to be English medium, the teachers themselves lacked competence in English and resorted to imposing rote memorization on children. The training component was found to be the strongest in the 'known practice' preschools where it was reported that all teachers were trained. While one-third of the teachers had pre-service training, almost all received induction and in-service training and were regularly mentored by the programme and academic coordinators.

Emerging models in preschool provisioning

Anganwadis and private preschools are widely available preschool education programmes across the country and are attended by the majority of

Teachers on the importance of preschool

Teachers, from all preschool programmes attended by sampled children, were interviewed to know their views on preschool education. All but three teachers believed that children should attend preschool to prepare for formal schooling. They thought that this would help children learn to exhibit socially desirable behaviour and adjust with their peer group. These were some of teachers' generic beliefs, but there were also some differences that were according to the programme they taught.

For example, Anganwadi workers gave more importance to preschool as a safe and secure space for young children while their parents were working. They saw Anganwadis as a space to care for young children. On the other hand, private school teachers believed that children learnt reading, writing, following instructions and discipline in preschool, which were considered to be prerequisites for primary school. Teachers from schools run by NGOs which included 'known practice' had a very different approach to preschooling since they believed that this was an important stage of development viz., helping the child get interested in education while also promoting their holistic development.

Good practices on training and mentoring: Some quotes from case studies

"Training of teachers is not forced. It is a two-way process between the trainers and students. During the training sessions, the actual classroom issues and concerns are also solved and discussed among all the coordinators, fellow teachers and mother teachers." – Teacher from known practice centre in Rajasthan

"The attention to detail comes through clearly in the overall training and mentoring strategy, which is recurrent and on-site. The recurrent training is planned keeping in mind realistic learning goals for the trainees. It is based on the trainees' existing practices, so as to be able to hand-hold them step by step and enable them to move from 'familiar to the unfamiliar', rather than over feed them with new information. Along with this slow but steady approach, the entire training is demonstration based, in actual model Anganwadi situations, which not only facilitates hands-on experience but also tends to sensitize the workers towards children, through this 'practice mediated' approach." - Case study from Maharashtra

"Another commendable feature of the project is its emphasis on learning from demonstrated good practice, the rationale for developing model observation Anganwadi centres" – Case study from Maharashtra

young children. Although anganwadis are run by the government through the ICDS, these were not always found to be the preferred choice of the parents who believed that private preschools are "*the place where children learn*". As shown in the previous sections, however, our assessment of private preschools in the sample indicates that these programmes follow a developmentally inappropriate curriculum for children under 6 years of age, by focusing on formal teaching of the 3R's.

Both these programmes were assessed on a three-point rating scale on various quality domains. A comparative analysis of the two types of programmes indicates that in terms of overall quality, they are not significantly different from each other.[30] Both these programmes follow a developmentally inappropriate curriculum, with teachers who are not adequately trained in preschool education. These centres are also not accessible to children with special needs. However, there are differences between the two programmes. Anganwadis were relatively better on components such as favourable pupil-teacher ratio which was very high in the case of private preschools, which influenced the adequacy of space for the children. Anganwadis workers were observed to be interacting with children as well as encouraging interactions among them, which however, was not observed in private preschools. One also witnessed some components of recitation of rhymes and poems and indoor play in anganwadis. On the other hand, private preschools had better infrastructure with the availability of water and toilets; school buildings were, in most cases, safer and cleaner. Teachers in private preschools followed a schedule or a daily routine which was not observed in anganwadis, although the curriculum in private preschools was not developmentally appropriate. In comparison to the ICDS centres, a greater emphasis was observed on personal grooming and social etiquette in private preschools.

The 'known practice' preschool in Rajasthan has emerged a better-performing preschool education programme as compared to the others. The 'known practice' centres scored better than the other two programmes on a large number of indicators assessed in the ECEQAS.[31] These indicators include the availability and use of adequate and appropriate learning and play materials, teachers follow flexible plans/schedules with age and developmentally appropriate curriculum which focuses on the holistic development of children. Teachers in these centres were also provided regular onsite training and mentoring by academic coordinators. Compared to anganwadis and private preschools, 'known-practice'

[30] The distribution mean scores of Anganwadis and private preschools on ECEQAS indicators is given in Appendix 5.4
[31] The distribution mean scores of regular preschools (Anganwadis and private preschools) and known practice centres on ECEQAS indicators is given in Appendix 5.5.

preschools scored lower on indicators related to safe and clean surroundings, as most of the these centres were located in unclean areas, outside the hamlets, where the land has been given by the community.

Three distinct types of models emerge from the discussion above on the various quality dimensions of these programmes. Table 5.2 presents the comparative profiles of these three models.

Table 5.2: Characteristics of different models of preschool programmes attended by children in the age group of 4 years

Indicators	Government-run Anganwadis	Private preschools	'Known practice' programme
Physical setting	Limited infrastructure and learning aids in classrooms	Better infrastructure, but very few learning aids	Limited infrastructure, but appropriate learning materials
Class composition	More children below age 4 and fewer in the age group of 4-6 years	Homogenous age group	Heterogeneous age group
	Low participation, leading to a good pupil-teacher ratio	High pupil-teacher ratio	Desirable pupil-teacher ratio
Curriculum transaction	No regular schedule followed	Fixed weekly schedule with supervision	Flexible weekly and monthly curriculum plans
	Formal teaching with some free play, songs, rhymes and better social interaction	Formal teaching with rote memorisation and no age appropriate activities	Age and developmentally appropriate activities
Preschool teacher	Community worker provided with minimal on the job training	Teachers untrained in ECE	Community teacher provided with continuous training and supportive supervision

A typical day in a preschool

Anganwadi: With some exceptions, Anganwadis generally act as a place where children come primarily to collect their mid-day meal and spend some time when parents are away at work. There is generally no planned ECE activity and children can be found playing among themselves while the Anganwadi worker does her own administrative work. When some activity takes place, it is invariably recitation of poems or rhymes or learning of letters or numbers. Although there are play materials appropriate for children available, they are not available in appropriate numbers. The material is rarely taken out for children as the worker fears it will get damaged.

Private preschool: The day starts with a prayer, generally recited/sung by a group of older children, while others repeat what is being sung. In class, children are generally taught formal subjects like Mathematics, English and vernacular language, often with a different teacher for each subject. At times, different songs and rhymes are sung subject to teachers' interest, otherwise the subject period gets over in getting notebooks checked by the teacher and copying what the teacher wrote on the blackboard. If children get distracted while copying from the board, the teacher asks children by rotation to recite numbers, tables, or letters and others in the class repeat after him/her.

Known practice programme: The day begins with a *"Bal Sabha"* (assembly), where the children sing prayers, and are encouraged by the teacher to express themselves. Afterwards the children are given updates on the day's news from the newspaper by the teacher or an older child. They are also given some knowledge about the current and historical affairs of the state. In the classroom the children are divided into two sections based on their age and the teacher carries out different activities with each group. The activities have a mix of individual and group activities. Free play is organized by the teacher where children pick up the material of their choice and play and experiment and teacher guides them through the process. Children are in the centre for about 3 hours; the teachers stay back longer to plan for the next day.

Interrelationships between preschool quality domains

To conclude this discussion, we explore whether we can derive lessons regarding planning for quality in preschool education from the diverse field experiences discussed and described above. For this purpose, the data elicited on the quality domains across the different types of preschool programmes and across the three states was further analysed to study interdependence of variables, by computing correlation coefficients[32] between the scores of the different domains. This analysis is restricted to the Rajasthan sample which offers a mix of different types of preschool programmes - anganwadis, private preschools and 'known practice' schools. The analysis yielded some interesting and significant associations, which indicate some clear lessons or directions.

1. Availability and use of play and learning materials is essential for a developmentally appropriate preschool curriculum.

The correlation between the curricular transaction observed in the preschools and availability and use of play and learning aids (manipulative materials like, blocks, puzzles, colours, clay, dominos etc.) ranges from moderate to strong. This is a statistically significant finding. A strong association is seen with fine motor development activities (r=0.68), cognitive development (r=0.71) and creativity (r=0.64). The strong association with motor development activities can be explained by the fact that activities related to motor development have to be individual and material based, such as threading of beads, colouring, or playing with manipulative materials. This requires availability of materials in adequate quantities. The fact that motor development was found to be a neglected area in the study across the programmes may be attributed to lack of adequate play and learning materials in addition to it being a low priority. Similarly, activities for development of creative and cognitive skills and concepts also require interaction with appropriate materials and this is reflected in the moderate association.

2. Focus on classroom management and organization emerges as a key input for a developmentally appropriate curriculum.

Classroom organization and management emerges as a very strong requirement for a developmentally appropriate preschool programme. Overall, its correlation with the curriculum content scores is very high (varying from r=0.56 to 0.73). This is a very important finding, given that most training programmes in ECE focus on conducting of activities, with little or no attention to this aspect of classroom planning, organization and management, particularly the significance of a balanced schedule, and a child centred classroom layout, which are key to children's participation. Again, as mentioned above, some of this is also possible or linked with availability of adequate physical space.

3. A democratic classroom environment with an interactive teacher is conducive to a developmentally appropriate curriculum.

As in the case of classroom organization, another strong association with the developmental appropriateness of the curriculum content (r= 0.56 to 0.73) is that of the nature of the teacher's disposition and resulting classroom environment. This association is consistently strong in all developmental domains, but in particular with language development activities and opportunities, as is evident in terms of specific indicators. These significant associations of the '*teacher factor'* with the developmental appropriateness of the preschool programme clearly indicate a strong interdependence of the nature of the teacher's disposition (r = 0.69), her democratic attitude towards classroom organization and the planning and transaction of her curriculum. A liberal, interactive teacher will not only allow, but also encourage, meaningful conversations and interaction in her class, free expression of ideas and creativity, and children's thinking and reasoning skills.

[32] Correlation matrix between different domains assessed in ECEQAS is given in Appendix 5.6.

4. Close interdependence and association exists between and among activities for different developmental domains.

A strong association (r ranging from 0.48 to 0.75) is evident in scores on activities for different domains, such as cognitive, language, motor and social development, indicating the value of an activity based approach. These benefits clearly establish the need for a 'whole child' approach in designing the curriculum, with a focus on some key play and development based activities and interactions, which together nurture and promote all aspects of development in children.

5. Formal learning and teaching of the 3R's in preschool has a negative relationship with developmentally appropriate activities.

An analysis of various indicators within domains indicates a negative relationship between formal teaching of reading, writing and arithmetic with readiness activities, particularly in Rajasthan and Telangana (r=-0.9 to r=-1.0), implying that wherever formal teaching is being done there is no space for readiness activities. Therefore, two different curriculum models emerge in practice, one focused on formal learning of the 3R's and the other, focused on nurturance of different aspects of a child's development. There is very little intersection between the two.

6. Physical facilities are an important but not sufficient condition for ensuring the quality of a preschool education programme.

The analysis shows that physical infrastructure has a moderate association with domains such as classroom management (r= 0.44), personal care and hygiene (r= 0.44), activities for creativity (r= 0.41) and social development (r= 0.45). The association with classroom management can be understood if we analyse the indicators for this domain, which reveal a strong correlation with availability of classroom space. These indicators relate to basic facilities necessary for organizing a flexible and activity-focused classroom arrangement, for planning and conducting age appropriate activities. These would require children to sit in groups, a planned layout of classrooms into activity corners and adequate space for children's movement and activity and so on. A moderate association is also found between physical facilities and social development activities, which again implies the need for space for movement and interaction, which is the key to development of social skills in children. Additionally, an association is found between availability of water, an infrastructure indicator, and personal hygiene and health habits, which is self-explanatory since this is particularly linked to handwashing.

All of these aspects are logically related to availability and adequacy of space and point to the availability of physical infrastructure as an important requirement. However, the fact that no significant association is established between physical infrastructure and the critical quality parameters such as the curriculum and the teacher's disposition implies clearly that it is an important but not sufficient condition for ensuring quality in early education.

5.3 Transition to primary school: early grades

At the primary level, sampled children mainly attended government and private primary schools, with the proportion varying across states.[33] In Rajasthan, the 'known practice' organization also offers primary grades. The physical infrastructure and other structural details of the private schools and the known practice centres have already been discussed in the previous section as there was no variation from that of preschools. In this section, we focus on the government schools that were not covered earlier in terms of structural description. Subsequently, all three types of programmes are discussed with regard to classroom management and planning. Again, the teacher section only presents the situation in government schools, as teachers' piece in the previous section focuses on private schools as well as on the known practice teachers and that applies to primary grades as well. We also explore the nature and continuity of experience of children from preschool to primary school in these government schools and in the private schools to which the majority of the children transition.

[33] The distribution of primary programme scoring maximum rating on different ECEQAS Plus indicators is given in Appendix 5.7.

Quality in preschool education: Lessons from nine case studies

Preschool Teachers: Quality of the teacher is the most critical factor in determining the quality of the early childhood programme. Most teachers focus on conducting the prescribed activities, but good quality teachers are able to understand the developmental principles underlying good practices. They are able to develop exemplary activities and interactions for the children that are appropriate to their age and developmental levels and contexts.

Capacity building strategies: Administrative supervision alone is not enough to support teachers. Initial (induction) training must be followed by recurrent short trainings to build the capacity of teachers. An effective combination of good quality training and supervision enables teachers to work effectively with young children. They must be supported through regular mentoring, where they have the opportunity to reflect on their interactions with children. Programmes need to also develop a system of supportive supervision where mentors are also regularly mentored.

Pedagogy and curriculum: Teachers consider children's age and developmental level when selecting activities and modify them based on individual needs and contexts. Some emerging principles are as follows:

- A good curriculum provides children opportunities for free play and guided activities. The different types of activities include large group, small group, individual and transition activities.
- A language rich environment allows children to interact spontaneously with their teachers and peers.
- Children learn concepts by doing things or participating in activities, not through rote memorization.
- Children are disciplined through positive guidance and there are strong policies against corporal punishment.
- Young children acquire school readiness skills only when these skills are specifically addressed in the preschool curriculum.

Classrooms: Classrooms with specific activity corners such as arts corner, books corner, dolls/dramatic play corner, blocks corner etc. facilitate children's learning. It is important to have classrooms with a print rich environment as this helps children engage in language activities and relate to print. Children's work must be displayed in the classroom. This instils a sense of pride in children and teachers. Materials must be attractive but familiar to children. Many programmes use a variety of local materials.

Some emerging issues:

(a) In many programmes, the language in the preschool classroom is different from the language in the primary school; however, this is not identified as an issue nor addressed systematically in most programmes.

(b) Financing is an issue. Unstable source of funds in NGOs is a barrier to sustaining innovative programmes and scaling these up. Also, programme cost is high in difficult terrains and remote areas with fewer children and higher costs of construction and maintenance.

(c) Costing of these known practices was an issue since these are in most cases partnerships with government or other institutions. In this scenario the financing patterns are shared between partners and the concerned organisations are unable to provide unit costs for individual components.

Infrastructure in government primary schools

In terms of physical infrastructure, government primary schools had better physical facilities compared to the preschool facilities discussed earlier. Almost 80 per cent of schools had spacious classrooms, clean and non-hazardous surroundings and were often protected with a boundary wall and gate. There was provision for toilets and drinking water in most cases. Except in Telangana, in almost 80 per cent of the cases, there were an adequate number of classrooms with one classroom per grade, but due to shortage of teachers, multi grade teaching was common. Unfortunately, even in the school sector only a handful of schools had accessible facilities for children with special needs.

Outdoor space and indoor learning material in government primary schools

Like the other categories of programmes, outdoor space is a limitation for government schools as well. Only one third of the schools had outdoor space, and moreover, these schools did not have any outdoor play equipment for children. The outdoor space was mostly used by children during lunch time and also before and after school hours. Play-based learning aids appropriate for transitional grades is scarcely present in the government schools, but over 75 per cent of the schools across the states had blackboard and chalk. Around 57 per cent of the teachers were observed using text books to teach children by reading aloud from the book, while only a small proportion of teachers (in Assam) used the textbook as a reference or resource book for teaching children. Children did not have any access to books other than text books in class, and the schools did not have class libraries.

Classroom composition, management and organization

As expected, the primary grades across government and private schools were very structured in nature, with the children sitting in rows behind one another. Children were allowed to sit wherever they wanted to sit, but the teacher did not use seating as an approach to promote inclusion of the more marginalized children. On the contrary, in many cases there was a gender bias, as boy and girls were observed sitting in separate rows. In government schools, however, about half of the classrooms had some display material which was appropriate for the children's age. In about 22 per cent of the cases, the classrooms were observed to be print rich with print on the wall which could be used to initiate learning. Private school classrooms did not have any proper or relevant display of material, while only a handful of private schools seemed to have a print rich environment. A negligible proportion (6 per cent) of classrooms had any child's work displayed.

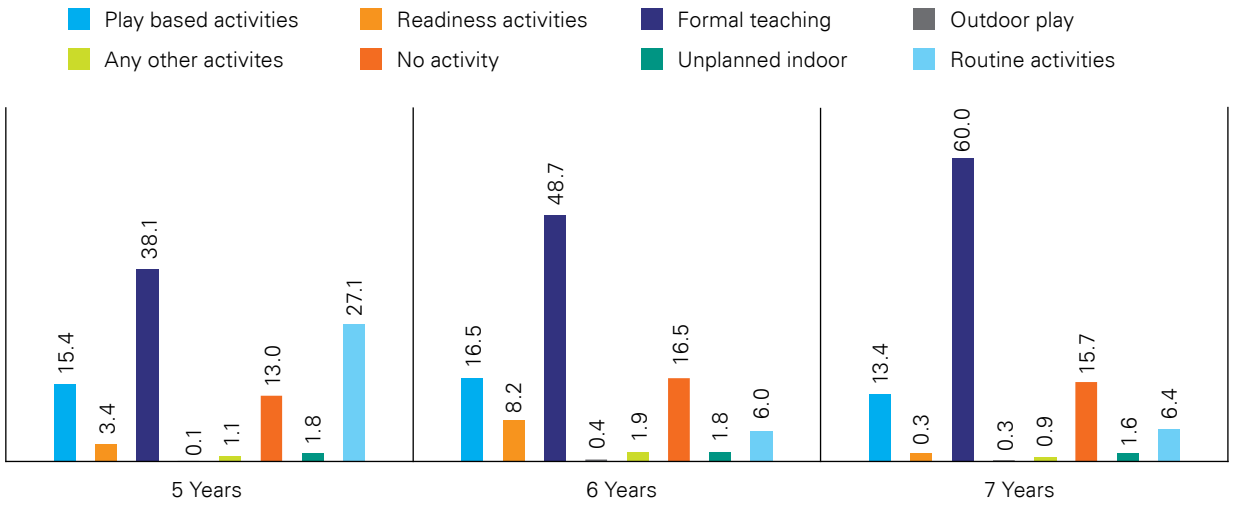
Multi grade teaching: Multi grade teaching was observed in more than two thirds of the government schools across the three states. This proportion was the lowest in Telangana where in about 61 per cent cases, one grade was observed in a classroom. However, in Rajasthan and Assam, most schools had more than one grade in the class. In these multi grade teaching spaces, the teacher was observed to use the same curriculum and activities for all ages and grades. In most cases, this involved focusing on one grade while ignoring the rest, and more often than not, the higher grades were given preference over the lower ones. In Rajasthan, the government school headmaster was assigned the youngest class, as it is believed that the workload for Grade 1 is low, which would allow the headmaster enough time for other duties. This reflects the lack of priority given to these transitional grades. A schedule or a plan was observed to be followed by 40 per cent of the teachers in government schools in Assam and Telangana, whereas this proportion was as low as 14 per cent in Rajasthan. The plan followed in most cases was the subject-wise timetable.

Private schools in Assam and Telangana had homogenous age-wise groupings of children in the class in most cases. In Rajasthan, in many cases, multi grade and mixed classes were observed, where two to three multilevel grades sat in the same classroom with a single teacher. In some cases, these teachers were even teaching a common lesson to all, irrespective of the grade and the comprehension level of the children. The private schools were observed to generally follow a weekly schedule with a subject wise timetable. The timetable was reported to be prepared by the teachers themselves as per the school management's instructions. However, in most cases, the planned activities were related to formal teaching of reading, writing and numbers. The curriculum was not observed to be developmentally appropriate.

Curriculum and Pedagogy

The overall picture emerging from the observation of classrooms is not very promising, as the curriculum followed by the government and the private schools focuses on the formal teaching of the 3R's, with limited emphasis on developmentally appropriate classroom practices. Due to shortage of teachers, multi grade situations are very common in government schools, making it difficult for the teacher to address the specific needs of the children. In most cases, the teachers resort to formal teacher-centric methodology of teaching. Most schools followed the teaching

Figure 5.6: % Time spent on different activities in government primary schools, by age



of the 3R's through rote and repetition, the other prevalent method being to get children to copy from the blackboard. In very few schools some readiness activities were carried out among the younger children (Telangana), while in the other states, children were involved in either copying from the board or doing some class work (language or number work) in their slates or notebooks. Interaction between the children and the teachers was not observed in government schools.

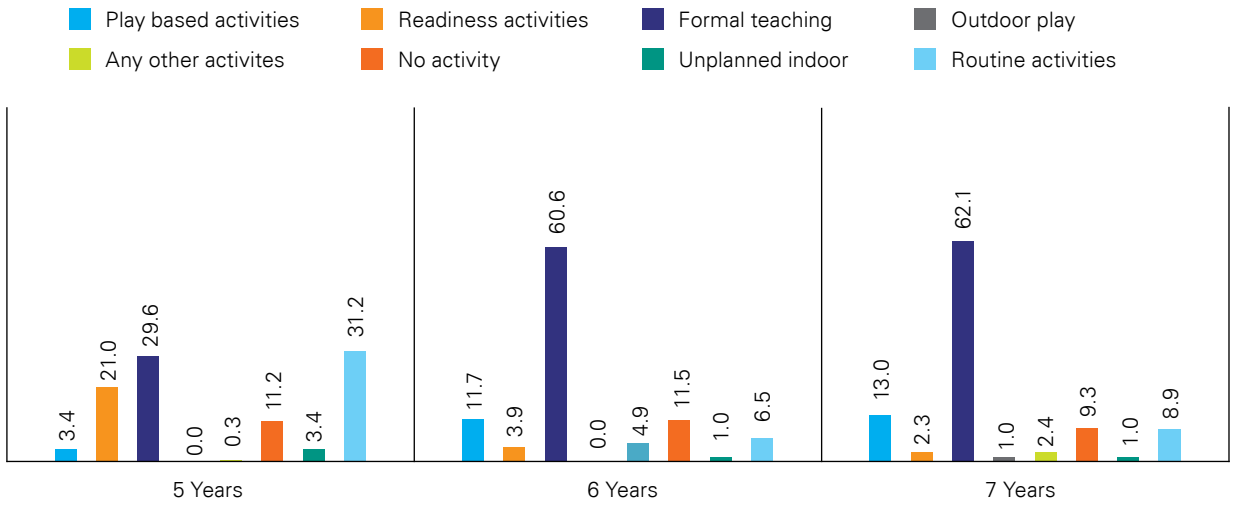
Figures 5.6 and 5.7 indicate the time children spent on different kinds of tasks at three assessment points, i.e., when the cohort was 5, 6 and 7 years old in the early grades in government and private schools respectively. Tables 5.3 and 5.4 show the state differences.

What is immediately apparent from these graphs is that the proportion of time spent on formal methods of teaching increases as children move to higher grades. Play and activity-based activities, which should ideally be the desired practice along the continuum, remain low across the three grades. One major concern is the significant amount of time that

Table 5.3: % Time spent on different activities in government primary schools, by age across state

Age	State	Play based learning activities	Readiness activities	Formal teaching	Outdoor play	Any other activity	No activity	Routine activities
5 years	Assam	4.2	1.2	41.5			21.6	31.1
	Rajasthan	3.8	4.2	27.1		8.3	12.1	45.0
	Telangana		20.0	66.7				13.3
6 years	Assam	12.9	2.5	55.3	0.7		20.0	8.7
	Rajasthan	5.2		48.7			29.0	15.0
	Telangana	27.3	22.6	42.0		6.1	1.0	1.0
7 years	Assam	24.0		37.3		21.6		16.9
	Rajasthan	7.7	3.6	55.2	4.6	1.0	23.2	4.6
	Telangana	17.9	3.1	66.3	7.4	1.0	2.3	2.1

Figure 5.7: Time spent on different activities in private primary schools, by age (%)



children spend on 'No activity', which remains fairly consistent across the three age groups in Rajasthan and Assam.

State-wise analysis of the time spent conducting different tasks shows that children attending government schools in Telangana were exposed to relatively more play-based teaching and learning activities and a negligible proportion of time was wasted by the teachers in 'No activity'.

The private school situation was to similar with a thrust on formal teaching, which increased significantly by the age of 6 years. Interestingly, the time spent on play-based activities also shows an increase over time though the proportion is very low. The primary grades in these schools were also observed to be very structured, and children were not given the opportunity to interact with each other. When asked questions, the responses were generally restricted to single word replies and there was little encouragement given by the teachers to the children to further elaborate on it. Peer interaction was minimal in private schools and children were observed sitting quietly through the day.

Table 5.4: Time spent on different activities in private primary schools, by age across states (%)

Age	State	Play based learning activities	Readiness activities	Formal teaching	Outdoor play	Any other activity	No activity	Routine activities
5 years	Assam	8.7	7.2	41.3			10.9	31.9
	Rajasthan	0.6	6.8	26.7			15.9	49.4
	Telangana	27.3	4.9	39.1	0.3	2.2	6.6	19.2
6 years	Assam	19.3	2.1	55.7			14.5	8.5
	Rajasthan	6.5		63.3			18.0	12.2
	Telangana	11.5	8.8	63.2		10.7	3.3	2.5
7 years	Assam	26.6	0.4	37.9	-	20.4	-	14.0
	Rajasthan	3.2	3.9	65.7	1.5	0.5	11.6	13.7
	Telangana	23.9	1.9	60.5	3.3	2.9	6.2	1.1

"Concept of a good teacher": Teachers' opinions vs classroom practice

Primary school teachers across the different states were asked about their concept of a good teacher. According to them, a good teacher is one who is punctual, regular and disciplined. She is knowledgeable and intelligent with good moral values, understands the needs of the children and teaches them in the right manner which is understandable to children. According to a number of teachers, a good teacher is one who is patient with children and does not punish them; rather, she works with them according to their strengths and weaknesses. Some also mentioned that a teacher should treat all children alike and should not show any kind of prejudice. Being child-friendly, mixing well with children, and being good with children were some traits most teachers mentioned.

However, during one and a half hours of classroom observation, it was seen that corporal punishment and use of abusive language in classrooms is very common to discipline and 'teach' children. According to observations in both private and government schools, abusive language was used in about 46 per cent schools; in about 39 per cent schools, children were physically punished; and in 11 per cent schools, the teacher physically abused the children regularly.

Teachers

Primary school teachers have higher educational qualifications than Anganwadi workers; about two-thirds of the private school teachers were graduates or above and very few had secondary or less than secondary education. On the other hand, a substantial proportion of teachers from the government sector had secondary or less education, although most of them are para-teachers in Assam. The training component of the government schools is considered to be very strong with regular in-service and refresher trainings. About one-third of the teachers had done a formal pre-service diploma such as Junior Basic Training (JBT), Diploma in Education (D.Ed.), Bachelor of Education (B.Ed.) etc., whereas more than half of the government school teachers had received pre-service training and one third had JBT training to teach primary grade children. These findings are similar to those reported by earlier research (Bhattacharjea, Banerji and Wadhwa, 2011). On the other hand, about three-quarters of the private school teachers had not received any kind of training.

5.4 Concluding thoughts

Anganwadis/government schools and private preschools are the two major models that are available to the largest segment of children in underprivileged communities in the country leading to near universal access to early education. As the findings from our assessment clearly indicate, these models incorporate only a few elements of good practice with some state level variations but with a predominance of developmentally inappropriate practices such as formal teaching methods, rote memorization and lack of essential facilities, with complete disregard for the age and developmental needs and capabilities of children in this stage of childhood. The known practice centres, which are able to demonstrate relatively 'good practice', are few and scattered and available to a very small number of children of specific communities. This issue reflects a wider concern that the programme implementers, teachers as well as managers and parents have minimal understanding of what defines quality in early childhood and how the learning and developmental needs of children at this stage are different from those of older children.

While quality of preschool programmes is a concern in its own right, a related concern is the similar trend in pedagogy continuing along the entire early learning continuum in the primary grades. This raises the issue of the lack in quality and child-centeredness of the entire foundational stage of education, particularly for first generation learners, and throws some light on the crisis of low learning levels in schools across the country.

Chapter 6

Does preschool participation improve children's school readiness?

Chapter summary

This chapter assesses the role of preschool exposure and the quality of the preschool in building children's school readiness. It also analyses the equity dimension of preschool participation in terms of whether it benefits children from privileged and disadvantaged backgrounds equally.

What was tested?

Children's cognitive, pre-literacy, and pre-numeracy were tested at age 4 and again at age 5 using the School Readiness Instrument (SRI). Children in the smaller Strand B sample were also assessed on behavioural aspects of school readiness using the Adaptive Behaviour Scale (ABS).

Did children's school readiness improve between age 4 and 5?

- Overall, children's cognitive, pre-literacy and pre-numeracy levels at age 5 were very poor relative to what is expected of a 5-year-old child. Children were able to do more tasks successfully than they had been able to do a year earlier, such as describing objects shown to them in complete sentences and successfully distinguishing between smaller/larger quantities. But some tasks, such as number comparison and phonemic awareness, continued to be difficult for children in all three states.

- In the psychosocial sphere, on the other hand, children's self-help, communication and socialization skills were high even at age 4, but they fared less well in the self-regulation domain.

- These findings suggest that children are poorly prepared to cope with the demands of the primary school curriculum and are at risk of falling behind even before entering Grade 1.

Does preschool participation improve school readiness?

- Multivariate regression analysis suggests that all else being equal, regular participation in a preschool between the age of 4 and 5 improves children's school readiness, although at age 5+ average readiness levels are still well below what is expected at this age.

- An analysis of the relationship between preschool programme quality and children's school readiness outcomes, conducted using

the smaller Strand B sample, shows that over the course of a year children participating in private preschools gained an average of 6 percentage points more than their counterparts in government Anganwadis on overall school readiness scores (SRS). However, the gains in SRS over one year were highest for those who attended the 'known practice' preschool programme that also scored the highest in terms of programme quality. In other words, exposure to high quality preschool programmes is significantly associated with school readiness levels at age 5.

Do all children benefit from preschool, irrespective of gender or socioeconomic background?

There is no simple answer to this question. The role of preschool participation in countering home or individual disadvantage varies by type of disadvantage as well as by state.

6.1 Introduction

In preceding chapters we looked at the facilities that were available for young children in sampled villages; characteristics that parents and community members felt were desirable in these facilities, and the participation trajectories of sampled children that resulted from the interplay between what families want, can afford, and what is available to them. We also examined variations in critical quality indicators across educational facilities and programmes attended by sampled children.

But does it really matter? Is it in fact the case that participation in an early childhood education centre improves children's school readiness? If it does, is this an effective way of providing early stimulation to children from disadvantaged families, or does it mainly benefit children who come from more privileged backgrounds? And are parents correct in thinking that privately managed preschool facilities do a better job of preparing children for school than other kinds of facilities?

6.2 The School Readiness Instrument

Chapter 1 discussed the multifaceted and multidimensional concept of school readiness, spanning young children's physical, cognitive, social, language, and emotional development. Investing in young children's school readiness has been shown by many studies to have enormous benefits for children's ability to succeed, not only in school but beyond. The IECEI Study assessed a subset of these domains, focusing mainly on children's cognitive, pre-literacy, and pre-numeracy abilities.[34] The assessment tool used, the SRI, is designed to test these skills and concepts at age 5 and 6. The tool was developed by the World Bank and standardized on an Indian sample.[35]

Within each of these broad assessment domains, the tool tests children on a range of competencies that are broken down into 10 specific tasks, summarized in Table 6.1. The maximum score assigned to each task varies from 1 (space concept) to 6 (reading readiness, sentence making), depending on the complexity and number of sub-items in the task, yielding a total score of 40 points.

The testing process

In order to assess changes in school readiness levels over the first year of the study, sampled children were tested twice using the same tool. The baseline assessment was administered at the beginning of the study (August – December 2011), when the children were between 3.5 and 4.5 years of age, and the end-line was conducted one calendar year later (August – December 2012). Children were administered the SRI one-on-one by trained field investigators.

[34] Other dimensions of school readiness, such as social and emotional development, have been assessed for the smaller sample of children included under Strand B of this study; see Section 6.3 below.

[35] For the purpose of this study the School Readiness Instrument was modified in terms of the instructions for administration of items along with some revision in the pictures used in the tool. The tool was also contextualized to suit the sample from the different states covered.

Table 6.1: Description of competencies and tasks in the School Readiness Instrument

Competency		Assessment activity	Score
Pre-math & number concepts	Pre-number concept	Given pictures of four apple trees, children were asked to point to the one with the least and most apples.	2
	Number/object matching	Children were asked to match three numbers with pictures showing the same number of objects.	3
	Relative comparisons	Children were asked to point to a number (among 9, 3, 7, 8) that was less than the number 5.	2
Cognitive & conceptual concepts	Space Concept	Given two illustrations of children and houses, children were asked to point to the one in which the child was behind the house.	1
	Sequential thinking	Children were shown illustrations of water filling up a bucket and were asked to determine the correct sequence for the pictures.	5
	Pattern making	Children were asked to repeat and complete a pictorial pattern.	5
	Classification	Children were asked to classify six creatures as either birds or animals.	6
Pre-literacy & language concepts[36]	Following instructions	Children were asked to raise their hands, and then to pick up an object and bring it to someone.	4
	Reading readiness, identifies beginning sound	Children were asked to identify the beginning sound of words and to match the two words with the same beginning sound.	6
	Sentence making	Children were asked to describe two photographs in complete sentences.	6
TOTAL			**40**

Testing young children can be challenging because they are often unused to interactions with strangers and nervous or uncomfortable at attempts to interact with them. Investigators were asked to begin by spending 5-10 minutes making the child feel as comfortable as possible by engaging in a predefined activity (such as colouring or looking at a colourful story card). For the same reason, attempts were made to test children at home as far as possible, to ensure the comfort of familiar surroundings. Investigators were asked to spend a maximum of 30 minutes administering the tool with each child.

Under the larger Strand A, a total of 9,123 children were tested at baseline and 9,931 were tested at end-line, when sampled children were approximately 5 years of age.[37] A total of 8,122 children were tested at both baseline and end-line assessments.

6.3 The Adaptive Behaviour Scale

Children in the smaller Strand B sample were also assessed on behavioural aspects of school readiness using the Adaptive Behaviour Scale (ABS), designed by the CECED at Ambedkar University Delhi. Primary caregivers were interviewed to understand whether children had acquired specific behavioural skills and competencies necessary for adapting well in the school setting. The four main psycho-social readiness domains include self-help skills, socialization, communication skills, and executive functions. Caregivers were asked to report on 20 indicators using a 3-point rating scale with three options or levels (rarely, sometimes or most of the time). The behavioural indicators on which the children were assessed are listed in Table 6.2 below.

The ABS was administered to the caregivers of the smaller sample (Strand B) by trained researchers. In most cases parents were interviewed, but when this was not possible, grandparents or aunts were interviewed. As part of Strand B, 2,779 children were assessed on the ABS at the time of the baseline and 2,282 during the end-line.

[36] All tests were in the official language of each state, i.e., Assamese in Assam, Hindi in Rajasthan and Telugu in Telangana.
[37] In Strand A, a greater number of sampled children could be tested in the end-line school assessment round than in the baseline round.

Table 6.2: List of indicators, the Adaptive Behaviour Scale

S. NO.	COMPETENCY	INDICATORS
1	SOCIALISATION	Does she play with other children?
2		Does she share things such as food/clothes/toys/books/any other thing with sister/brother/friends?
3		When you go over to your relative's or friend's house (whom you visit often) is she happy being on her own with them or does she cling to you?
4		Does she address elders such as teachers, parents, grandparents, neighbours in the same way as with her peer group? Or differently?
5		Does she help in the chores at home on her own?
6	SELF HELP SKILLS	When she goes out to play or to school with some of her belongings does she bring them back?
7		Does she go to toilet (in the daytime) on her own?
8		Is she able to wear clothes on her own?
9		Does she wash her hands before and after meals?
10		Does she return from school/temple/shop (any nearby space) on her own?
11	COMMUNICATION SKILL	When somebody comes to your house and asks her for you, is she comfortable talking to him/ her or is she hesitant and shy?
12		Does she share with you or someone else at home about what she has done in school or with friends?
13		If you have to send a message to someone in the family at home or in the neighbourhood, do you send her?
14		What is the reaction when somebody snatches something from her hand? How does she express anger or disappointment?
15		Does she communicate anecdotes or stories in right order?
16		Does she interrupt you when you are engaged in conversation with her?
17	SELF-REGULATION	Does she recognize emotions of anger, sadness and anxiety on your face?
18		What does she do when you refuse her unreasonable demand?
19		Suppose you ask her to draw/write/colour/arranging her clothes or toys (any other work) does she complete the task or leave it half way?
20		When she is playing with siblings or children from neighbourhood, does she wait for her turn?

6.4 How did children's readiness for school evolve between age 4 and age 5?

It is important to keep in mind that the SRI was designed to assess children at age 5 and 6. During the baseline administration for this study, when children were 4 years old, they were not expected to be able to do many of these tasks. But by the end-line, when children were an average of 5 years old, it was expected that they would do significantly better. This section presents some examples of tasks that children could do easily, as well as those that they struggled with. Importantly, the trends observed in the larger, randomly selected Strand A sample are the same as those in the smaller, purposively selected Strand B sample; therefore only estimates for the large sample are presented here.

What could children do at age 4?

Of the ten tasks given to children, there were two which the majority of children in all three states could do even at age 4. One was the task on spatial

Figure 6.1: Spatial concept task

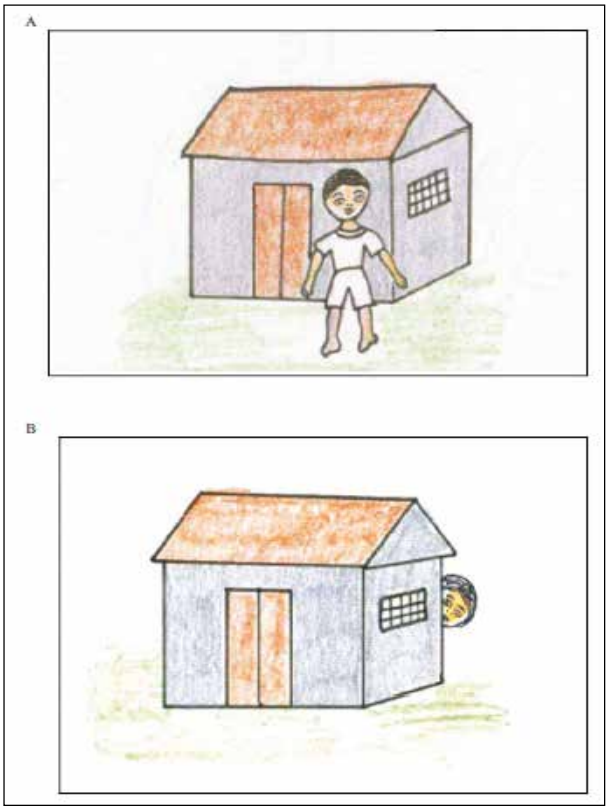


Figure 6.2: Sentence making task

concepts, where children were shown two pictures – one of a child in front of a house, and the other of a child behind a house (Figure 6.1); children were asked to point to the picture where the child is behind the house.

Overall, more than 70 per cent of sampled children in the larger data set could do this task even at age 4, with some variation across the states (from a low of 66 per cent in Rajasthan to a high of 77 per cent in Telangana). By the end-line a year later, 90 per cent of children in every state could do so.

The second task that most children were able to do even at age 4 was to follow instructions. It is noteworthy that children in Rajasthan did by far the best when it came to following a relatively complex series of instructions (such as: "Go and pick up a paper from over there and give it to your mother. Then come and sit with me") – and their ability to do so was better than that of children in other states even in the end-line assessment. Given that fairly large proportions of children in Rajasthan were non-participating at the time of the baseline assessment, this seems to reinforce the conclusion that children learn to follow instructions early on at home and in other social settings, rather than solely in preschools or schools.

In terms of behavioural skills measured by ABS at age 4, according to the responses of the primary caregivers, 90 per cent of the Strand B sample was comfortable around their peer group and about 80 per cent of children had the communication skills to pass on a particular item of information. About 75 per cent of the children were also toilet trained.

Where did children show the most gains between age 4 and age 5?

Children's ability to form complete sentences shows interesting patterns of evolution over the year. Children were shown two pictures and asked to describe each in complete sentences (Figure 6.2). Most children in all three states could do this task partially at age 4 (where "partial" scores include cases where children were able to identify the picture and/or say something relevant about it, but could not describe it in complete sentences).

This task is one where the influence of institutional participation appears to be substantial. In Telangana,

where the proportion of children participating in private preschools was high, 17 per cent of 4-year-olds could do this task; this proportion increased substantially to 30 per cent by age 5. In Assam, on the other hand, where there was high participation throughout the year mainly in Anganwadis, similar proportions of children were able to do this task in the baseline (14 per cent) but there was a much smaller increase over the following year. And finally, in Rajasthan, where high proportions of children were non-participating during the first year of the study, we observe a decline from the baseline to the end-line in the proportion of children who could do this task correctly.

Children showed considerable improvement in two of the three tasks intended to measure pre-numeracy concepts and skills. The first of these tasks was related to children's ability to distinguish between larger and smaller quantities – in this case, by looking at pictures of trees with fewer or more apples. During the baseline assessment, between a quarter and half of all children demonstrated full mastery of this task, depending on the state: 48 per cent in Assam, 40 per cent in Telangana, and 24 per cent in Rajasthan. A year later, these proportions had increased by about 25 percentage points in each state.

The second task assessed children's ability to relate quantities to numeric digits by matching numbers to collections of objects representing the same number. A substantial increase in the proportion of children who could do this task at age 5 is visible in all three states. But the proportion continued to be low at 31 per cent in Rajasthan, 33 per cent in Assam and 43 per cent in Telangana.

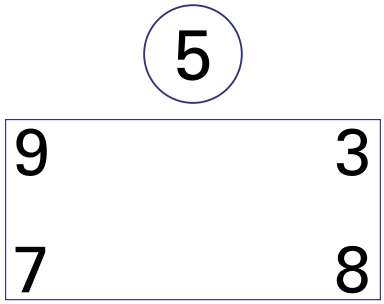
Examples of behavioural competencies, measured by ABS that showed maximum gains from the baseline to the end-line were self-help skills like getting ready on their own, which included getting dressed and buttoning shirts, which are also linked to children's fine motor skills. At age 4, only 28 per cent of the children could *get dressed on their own*, but after a year this proportion had increased to over a half of the sample (54 per cent). A significant improvement was also seen in the indicator which assessed children on separation anxiety. Based on responses from primary caregivers, there was a 14 percentage point increase in the proportion of children who did not show *separation anxiety when away from family members* at age 5. This is an important dimension of behavioural readiness which is necessary for a child to be comfortable in a school environment away from family and parents.

What tasks did children find difficult even at age 5?

Some tasks were difficult for most children even at age 5. For example, the third pre-numeracy task tested children's ability to identify larger and smaller numbers from a given set of single digit numbers. Children are asked to point to the number that is smaller than the number in the circle; to do so they had to be well versed with both the concept and the representation of single digit numbers (Figure 6.3). Most children were unable to do this task, with only 30 per cent being able to do so even at age 5. A point worth noting here is that of those children who could do this task, 42 per cent were in Telangana.

Among the tasks testing language skills and concepts, the task of phonemic awareness proved to be impossible for almost all children in all states with virtually no progress observed between age 4 and age 5. In this task, children were asked to identify the object shown in a picture, identify the beginning sound of the word, and identify another picture in the set that represented an object that began with the same sound. Phonemic awareness has been demonstrated to be an important stage in the acquisition of language and literacy skills; however, as many as 85 per cent of all children in the sample were unable to identify the beginning sound of the pictured objects even at age 5.

Figure 6.3: Relative comparisons task



In terms of psycho-social readiness, as measured by ABS, *emotional regulation* emerged as a difficult area for children. According to parents, children were not persistent and about half the sample would start doing a new task rather than finish the work they set out to do. Only a quarter of the caregivers said that children would not nag or throw a tantrum if their demands were not met.

How did children do overall?

We now turn to an examination of how children's overall levels of psycho-social readiness and school readiness, as measured by the twenty items on ABS and ten items on the SRI changed between age 4 and age 5.

As mentioned in Section 6.3, the psycho-social readiness of children was assessed through interviewing the primary caregiver of the child, using domain-specific situations as examples during the baseline as well at the endline. Figure 6.4 depicts the average scores of the sampled children across the sub domains in ABS at the baseline and the gains made by the children by the end-line.

In terms of readiness for school, the sub-domains that clearly stand out as positive in the psychosocial sphere are self-help, communication and socialization skills, while the self-regulation domain has a lower average score. While maturational factors are known to make a significant contribution to these self-regulatory functions, these can also be scaffolded through a well-planned and child-friendly preschool programme of activities and interactions.

Overall, the gain in ratings on psychosocial skills was not very striking, since the baseline scores were already fairly high. The difference at end-line appears to be more in terms of enhancement in children's autonomy and self-reliance since children were older and more mature.

Figure 6.5 shows the distribution of baseline and end-line SRS across the three study states. In all three states, the distribution shifted to the right between the two assessments, indicating that children's school readiness – as tested by the SRI – improved over the intervening year. Overall, the average score at age 4 was 27.8 per cent and at age 5 it was 42.5 per cent, a gain of about 15 percentage points – not a large, average gain, and one that leaves children well behind where they are expected to be at age 5 in terms of school readiness.

Children in Assam had the highest SRS at both the baseline and the end-line (33.7 per cent and 47.8 per cent respectively), followed by those in Telangana (32.4 per cent and 45.3 per cent) and Rajasthan (20.7 per cent and 37.1 per cent). Children in Rajasthan had the lowest score at the baseline but made the maximum gains in scores between the baseline and end the line, such that the difference in mean percentage scores between Rajasthan and the other states reduced by the end-line assessment (Figure 6.5). Despite the increase in scores at the end-line

Figure 6.4: Mean scores of sampled children (N=2282) on Adaptive Behavioural Scale

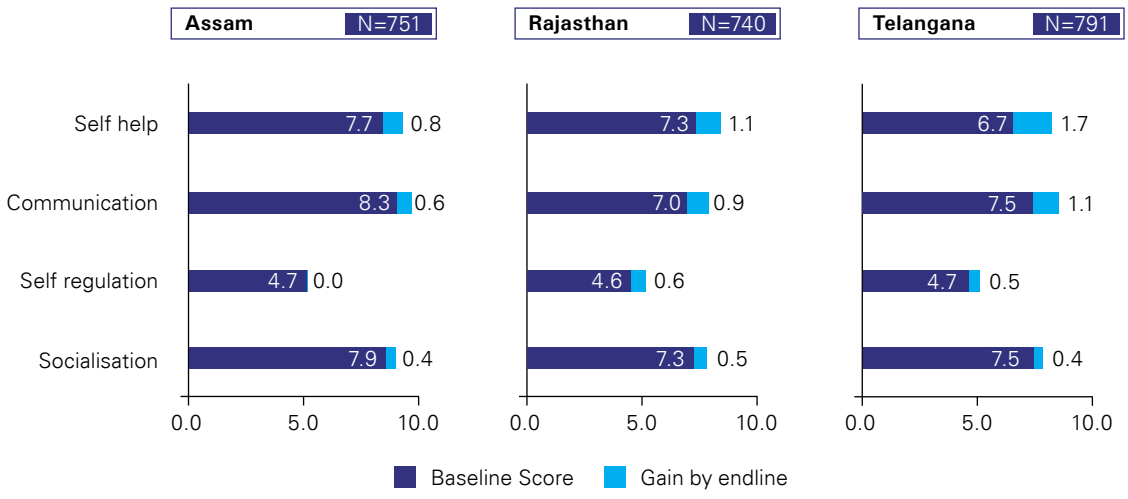
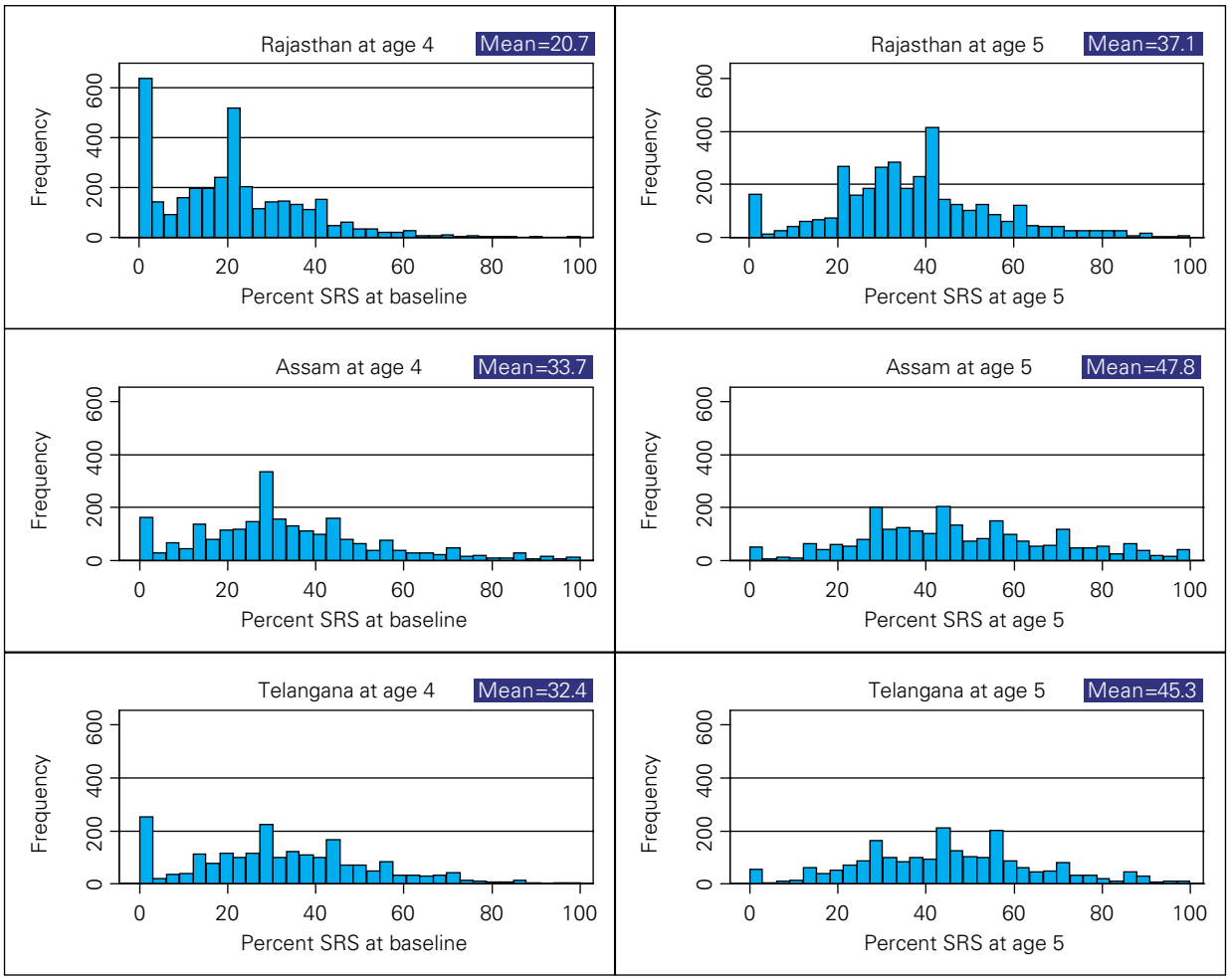


Figure 6.5: Distribution of SRS in the study states



assessment, children's school readiness at age 5 remained extremely poor, with average percentage scores below 50 per cent in all the states.

6.5 Are the observed gains in school readiness due to children's preschool participation?

In the previous sections of this chapter we described the school readiness tool, some of the competencies it measures, and how children's performance on this assessment evolved between baseline at age 4 and end-line at age 5. We also saw that although children's cognitive, pre-literacy, pre-numeracy skills improved during the intervening year, they were poor relative to what a 5-year-old child is expected to be able to do.

Children learn as a result of many different factors, including their normal development and the home and social environments to which they are exposed. In order to understand the extent to which the observed gains in school readiness are attributable to children's exposure to early childhood education programmes, we look at these scores in the context in which they were achieved. This includes taking children's personal and household characteristics as well as their quantum of exposure to preschool into account. Accordingly, in this section we analyse the role of children's preschool participation in their SRS, first in an uncontrolled, and subsequently, in a multivariate framework.

The 'uncontrolled' relationship between participation and school readiness

We begin by categorizing the sampled children according to the extent of their exposure to a preschool programme during the first year of the study. Children's participation status was first recorded when they were administered the baseline school readiness assessment at the start of the

Table 6.3: Distribution of children with 'only ECE' exposure by number of exposures between age 4 and age 5, by state

No. of exposures to preschool	Assam	Rajasthan	Telangana	Total
1	0	48	0	48
2	4	236	44	284
3	240	66	29	335
4	2530	1097	1147	4774

study (SRI baseline at age 4). The first assessment round was followed by two rounds of tracking visits wherein details of the participation status of sampled children was collected. Participation data were also collected when the SRI end-line assessment was administered at age 5. Thus, between the SRI baseline and end-line test, a child could have had between 0 and 4 exposures to preschool.

Given children's varied and non-linear trajectories described in Chapter 4, in order to isolate the effects of preschool participation on SRS, we removed children who had any primary school exposure during the year. Table 6.3 summarizes the number of preschool exposures of the remaining sub-sample of children. A count of 0 indicates that a child was non-participating; that is, she was neither in preschool classes nor in primary school during the first four rounds of data collection for the study. A count of 1 indicates that she was participating in a preschool class during one of the first four rounds of data collection and not participating anywhere during the 3 other visits. A count of 4 indicates that she had exposure to preschool in all four rounds of data collection during the first year of the study.[39]

The table reinforces the observation made in Chapter 4 that young children do not follow a single 'national' trajectory. For example, children in Assam and Telangana had far more exposure to preschool on average (few or no children had 1 or 2 out of 4 possible exposures). In Rajasthan, on the other hand, a fairly large number of children were in these low-exposure categories.

Table 6.4 presents cross tabulations of children's preschool exposure with mean percentage SRS at age 5. We see that, overall, each additional exposure to preschool is associated with an increase in the average SRI score. For example, the mean SRI score for children with 1 exposure to preschool during this year was 20.6 per cent, as compared to children with

Table 6.4: Mean end-line SRS for children with only preschool exposure by number of exposures across study states

No. of exposures to preschool	Assam	Rajasthan	Telangana	All children
1		20.59 (46)		20.59 (46)
2		32.26 (232)		33.25 (274)
3	40.35 (234)	27.00 (56)		37.72 (314)
4	46.63 (2469)	38.89 (1070)	42.58 (1090)	43.89 (4629)

Note: The sample numbers are shown in parentheses. Mean is not shown for cells with insufficient observations.

[39] Unlike Chapter 4, which restricts the analysis to children successfully tracked and for whom we have participation information for all 11 rounds of data collection, the analysis here is restricted to children successfully tracked and for whom we have participation information in the *first 4 waves* of data collection. No child in the sample remained non-participating across all 4 visits.

2 exposures to preschool who scored an average of 33.2 per cent and children with 3 exposures whose mean score was 37.7 per cent. However, much of this relationship is derived from the performance of children in Rajasthan where there are a fairly large number of children in each exposure category.

Relationship between participation and SRS in a multivariate framework

While Table 6.4 suggests that each additional exposure to preschool leads to an increase in end-line SRS, it is unclear whether the increase in scores can be attributed to the additional exposure to a preschool – that is, whether it holds true in a 'controlled' framework. All else being equal, is it the case that each additional exposure to preschool increases end-line SRS? For example, let us imagine two children of the same age[40] and gender, belonging to households with the same social and economic characteristics. Imagine that both children had the same score in the SRI baseline assessment at age 4. Over the subsequent year, one child was in preschool for several months (let's say 3 exposures in our measurement framework), while the other was in a preschool for the full year (all 4 exposures). In this hypothetical scenario, is it the case that the child with 4 preschool exposures achieves a higher score on the SRI end-line at age 5 than the child with fewer exposures?

Multivariate regression analysis with end-line school readiness as the outcome variable and preschool participation as the key independent variable helps to answer this question.[41] Table 6.5 presents the coefficients of preschool participation in the regression models.[42,43] Regression analysis confirms the hypothesis that all else being equal, on average, each additional exposure to preschool is associated with a 3.8 percentage point increase in school readiness for the entire sample, and a 21.7 percentage point increase for the sub-sample of children with exposure to only preschool. Going back to our imaginary children, what this means is that the sampled child with all 4 preschool exposures will, on an average, have a school readiness score at age 5 that is 21.7 percentage points higher than that of a child with only 3 preschool exposures. The regression results also show that private preschools on an average contribute about 13 percentage points more to children's school readiness than government preschool facilities.

Table 6.5: Participation coefficients for end-line SRS in a controlled regression framework for all states together

	State FE models	OLS
Model with all sampled children	3.865***	4.448***
Model with children with only preschool exposure	21.67*	35.43***

Note: ****p< 0.01, **p<0.05, *p<0.1

[40] Between age 4 and 5, older children scored higher in SRI.

[41] The model controls for children's individual, household and other background characteristics. Specifically, these are: age, gender, and current grade (individual characteristics); mother's education, caste, household affluence, and home language (household characteristics); whether the household has reading materials or not (as a control for learning support at home); and management type of the educational institution (school or preschool) attended at age 5.

[42] In addition to the standard Ordinary Least Squares (OLS) model, we run a state fixed effects model taking into account state level factors that might affect the relation between preschool participation and SRS. The regression analysis is run on two groups of children-all sampled children and a sub-sample of children with only exposure to preschool. Our hypothesis is that the impact of participation in preschool is higher for the sub-sample of children with only preschool exposure as compared to all children, which includes children with exposure to primary school.

[43] Appendix 6.1 gives the detailed regression results for all states together.

6.6 Does programme quality matter?

The bivariate and multivariate analysis on the larger data set (Strand A) presented above empirically establish an association between the participation of 4-year-olds in preschool and their school readiness levels at age 5. Similar results are seen in the smaller data set of Strand B as well, where participation in a preschool programme emerges as a significant predictor of children's school readiness, along with other child factors such as age, baseline score on the SRI, and household factors such as maternal education level, economic affluence, and print environment at home. This smaller, deeper analysis conducted under Strand B also enables us to identify specific elements of preschool programmes which influence children's readiness levels.

Relationship between programme quality and SRS in an 'uncontrolled' framework

In order to understand the relationship between the quality of preschool programmes and school readiness levels, Table 6.6 below presents the mean percentage scores of children in different types of preschool programmes at baseline and end-line.

As described in Chapter 5, Strand B had purposively included a sample of some 'known practices' in preschools. Table 6.6 shows that in comparison with Anganwadis and private preschools, the known practice model scored the highest on quality as assessed in ECEQAS. Although the end-line school readiness percentage scores for children attending the known practice centres and private preschools are the same, the gains over one year are the highest for those who attended the known practice programme.

Another way to illustrate this relationship is to look at the age by which children acquired specific school readiness competencies. In the earlier sections of this chapter, we saw that even though children's school readiness improved over one year (from age 4 to age 5), overall levels were low; most children had not mastered the required foundational skills before entering school. Some of the tasks measuring school readiness competencies were therefore included in the early grade assessment tools as well. We present two examples here. In each case, the average scores from the larger Strand A sample as a whole are plotted alongside scores for the smaller dataset from Strand B for children who attended the known practice preschools. These results should be interpreted with caution because of the small sample size of the known practice sample.

For the first task on *pattern making*, children were required to replicate the given pattern in blank spaces using the cut outs given to them. The ability to recognize a pattern not only supports math learning but also promotes logical thinking among children by being able to predict what comes next. At age 6, only a third of children in the large sample are able to do this task completely, and it is only by age 8 that about 80 per cent children are able to complete this task (Figure 6.6). At each age, a higher percentage of children attending the known practice preschools were able to complete the task, although the gap between the large random sample and the children who attended the known practice programme narrows over time.

The second task assessed *sequential thinking,* which helps the child develop an understanding of ordering and sequencing of numbers/objects. It also helps the child to arrange language, thoughts and information. In the large Strand A sample, we see once again that it is only by age 8 that about 80 per cent children are

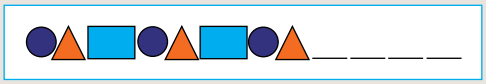
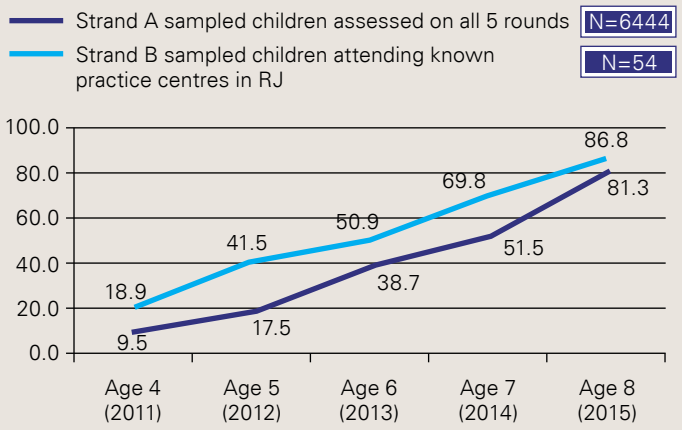
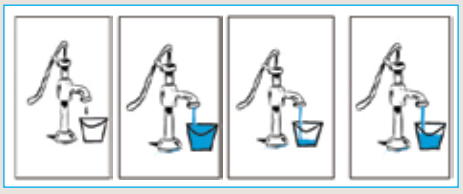
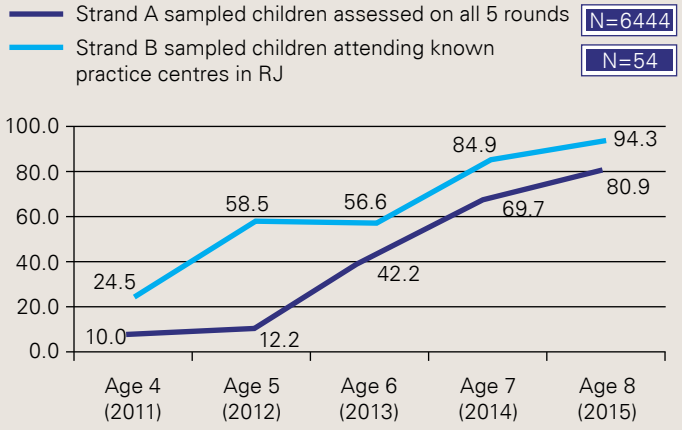
Table 6.6: Mean school readiness (percentage) scores at baseline and end-line, by different preschool programmes

ECE programme type	N	Average ECEQAS score (%)	Average baseline SRI score (%)	Average end-line SRI score (%)	Gain SRI
Anganwadi	907	42.9	30.0	39.8	9.8
Private preschool	829	41.9	31.7	47.4	15.7
Known practice	76	69.2	28.3	47.8	19.5

able to do the task. Children attending the known practice preschools, on the other hand, mastered the task earlier. By age 7, about more than 80 per cent were able to complete the task.

We know from the analysis in Chapter 5 that the preschool programmes in the known practice model were observed to have a more developmentally appropriate curriculum for children with a focus on language and cognition, and with the majority of classroom time spent on play based learning activities. A number of opportunities and activities for concept formation, development of conceptual skills and readiness activities had been designed for the children in these programmes. It was also observed that children were much less exposed to formal reading, writing and arithmetic and had a greater focus on school readiness.

Figure 6.6: Evolution in sampled children's ability to do specific school readiness tasks between age 4 and age 8, Strand A and Strand B

Skill/ Competency	Children's progress over time
Pattern making/Logical thinking Children were shown an incomplete pattern with two repetitions and were asked to complete additional steps in the sequence. 	**Percentage of children who could complete the task** 
Sequential thinking Children were shown picture cards depicting the stages of water filling in a bucket and were asked to arrange the cards in a sequence. 	**Percentage of children who could complete the task** 

6.7 Do all children benefit equally from preschool participation?

The focus of Section 6.5 was on the impact of preschool participation on the sampled children's school readiness levels overall. Regression results show that exposure to a preschool programme between age 4 and age 5 does improve readiness for school, although these levels continue to be low. Moving beyond average effect sizes, a fundamental argument in favour of early childhood education is its role in closing the gap between children who are from less and more privileged backgrounds. The question posed in this section, therefore, is: do all children benefit equally from preschool? Do children from disadvantaged backgrounds or communities benefit from preschool participation as much or more than children from privileged backgrounds?

The main axes of stratification in India are along lines of gender, caste and class. Mother's education is known to be positively associated with children's educational outcomes (Banerji, Berry and Shotland, 2013), and to help overcome caste and class based institutional disadvantages (Dréze and Sen, 2003); in this section, we examine the effect of these indicators on sampled children's learning outcomes. If home language is not the same as the state vernacular, it hinders children speaking a minority language from achieving the same learning levels as their other peers (UNICEF and Jharkhand Tribal Welfare Research Institute, 2013, Bühmann and Trudell, 2008, Cummins and Swain, 1986). Therefore, in addition to gender, caste and affluence, we examine home language as another axis along which young children may be disadvantaged.

Equity trends in SRS in an 'uncontrolled' framework

Since the focus of this section is on the equity impact of preschool and factors such as gender, affluence and caste are of varying importance across the different states (Desai et al., 2010, Dréze and Sen, 2003), the discussion here is specific to each state rather than overall. As in previous sections, the discussion on equity is first placed in an uncontrolled framework and then in a multivariate regression framework.

Table 6.7 below shows the mean SRS and the result of significance tests for the sub-sample of children who had full preschool exposure between baseline and end-line school readiness assessments (that is, the total preschool exposure count is 4) by gender, affluence, caste, mother's education and home language, separately for each of the three study states.[44] These data suggest that the relationship between school readiness and the child's gender, mother's education, home language, caste, or household affluence varies across states. On an average, 5-year-old boys have higher SRS than 5-year-old girls in all three states. These differences are significant in Rajasthan and Assam, but not in Telangana. While the gender difference is only about 1 percentage point in Assam, it is larger at 4 percentage points in Rajasthan. This is perhaps not surprising given that development literature suggests that Rajasthan is one of the states where gender based social norms are prevalent.

In Rajasthan and Assam, there is a difference in the mean scores of about 14 percentage points between children whose mothers are illiterate and whose mothers have education beyond primary level; in Telangana, the difference is much smaller at around 5 percentage points. The difference in effect size of mother's education may be due to state level nuances. As also seen in Figure 6.4, which shows the relationship between the children's SRS in baseline and end-line by three categories of mother's education, the difference in scores between the groups of children increases over one year, with children of more educated mothers gaining more in terms of school readiness than those of mothers with less education.

[44] We focus on full preschool exposure during one year with the rationale that this allows us to best analyse the equity effects of preschool participation; anything less than full preschool exposure is likely to dilute the impact of this participation.

Table 6.7: Mean end-line SRS by selected gender, caste, affluence, mother's education and home language for sub-sample of children with 'full' preschool exposure

Category	Assam	Rajasthan	Talangana
Gender			
Boys	47.42	40.72	43.05
	(1205)	(596)	(586)
Girls	45.91**	36.59***	41.99
	(1260)	(474)	(503)
Mother's education			
No schooling	39.93	33.70	40.27
	(654)	(548)	(402)
Beyond primary	53.72***	47.43***	45.65***
	(982)	(322)	(461)
Home language			
Same as the state vernacular	52.19	41.17	43.27
	(1084)	(285)	(921)
Different from the state vernacular	42.29***	38.06***	38.89***
	(1385)	(785)	(169)
Affluence			
Bottom 25	44.13	30.59	41.41
	(1180)	(128)	(96)
Top 25	55.26***	43.54***	45.09*
	(329)	(512)	(340)
Caste			
SC	47.63	36.87	39.56
	(199)	(123)	(239)
General caste	51.13**	43.72***	47.13**
	(926)	(160)	(47)

Note: ****p< 0.01, **p<0.05, *p<0.1

Home language as a marker of stratification is significant in all three states, but it appears to be of substantial importance only in Assam, where the difference between children whose home language is not the same as the state vernacular and those for whom it is the same is as much as 10 percentage points. This is not a surprising result given the complexities surrounding language and identity in communities and schools in Assam (Singh, 2013).

Affluence[45] makes a large and significant difference in Rajasthan and Assam. In Telangana while the difference is still significant, it is not a large gap. Figure 6.7 shows this relationship very clearly. These graphs plot average SRS at age 4 and age 5 for children from the most affluent and the least affluent households of the sample, separately for each state. The graph lines diverge in Assam and Rajasthan (the gap between children from most and least affluent households is growing), but they converge in Telangana (the gap is diminishing).

Caste appears to be significant as well. In Rajasthan, the difference between SC and general caste children

[45] Information on consumer durables owned by the family of sampled children was collected during the household survey. Considering the number of consumer durables owned by the family as a proxy for household affluence, we categorize children into two groups: low asset households (those that own less than 3 durables) and high asset households (those that own 3 to 7 consumer durables).

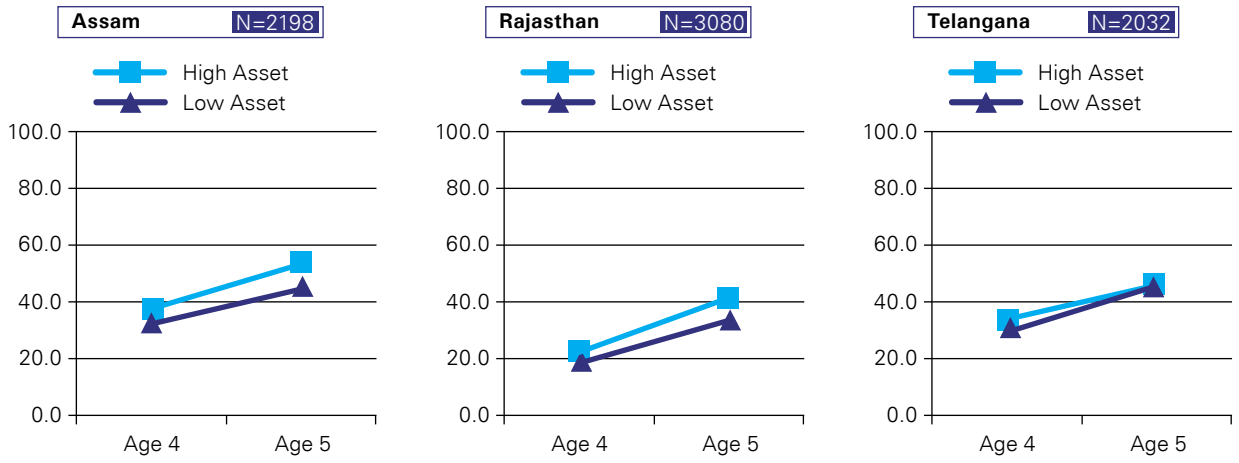
is as much as 7 percentage points; in Assam, the difference is smaller at around 4 percentage points. While the differences are visible in Telangana too, they are hard to interpret because of small sample sizes.

Equity trends in SRS in a multivariate framework

To what extent do these dimensions of inequality continue to be significant in a multivariate framework? Regression models presented in Appendix 6.2 help answer this question, and confirm that there is no simple answer. The role of preschool participation in countering home or individual disadvantage varies considerably by type of disadvantage as well as by state.

Looking first at gender and affluence, we find that both these dimensions remain significant in Rajasthan, even in a multivariate framework, which takes into account various individual and household characteristics, as well as participation in preschool. In other words, participation in preschool does not help children

Figure 6.7: Mean school readiness (percentage) scores at baseline and end-line, by household affluence



override the effects of gender and affluence on their SRS. In the other two states, in the multivariate framework, gender and affluence are not significant variables, suggesting that preschool participation does help children overcome disadvantages stemming from these characteristics.

Mother's education is significant in Rajasthan and Assam, suggesting that controlling for other background characteristics as well as preschool participation, children in these states whose mothers are more educated are likely to have higher SRS than their peers whose mothers have less education.

Caste differences (between SC and general castes) do not appear significant in any of the three states suggesting that, all other things being equal, preschool participation helps to override these differences. However, as mentioned previously, caution is needed while interpreting this finding because of sample size issues, especially in Telangana (See Table 6.6 above). The regression

Does a good preschool programme help reduce equity gaps? An exploratory analysis

Although there is no conclusive evidence in India that preschool participation can bridge the gap in school readiness between children from less privileged and more privileged backgrounds, exploratory analysis of data from Strand B of this study provides some indications that this might hold true in the Indian context as well.

The analysis is exploratory because it is based on a very small sample: Strand B children from Rajasthan, who were participating in all three types of preschools, and who were then divided into two groups on the basis of their scores on indicators constituting privilege. These include household characteristics like caste and asset index (estimated on availability of consumer durables), maternal education and availability of reading material at home. Children belonging to non-general caste with mothers having no schooling, coming from households without any reading material and low asset index were grouped together. Those belonging to general caste, having some reading material at home and relatively high asset index with mothers having primary and above education were categorized as a separate group. Children in the first group had attended all three preschool models (Anganwadis, private preschools and known practice centres), but children in the second group had only attended private preschools as Anganwadis were not a preferred choice of affluent families and the known practice centres catered largely to deprived communities.

The gains made by these two groups from the baseline to the endline on SRI (Table 6.8) suggest that a good quality preschool programme can bridge the gap between more and less privileged children. Even though the children from less privileged families have much lower scores at the baseline, those who attended known practice centres caught up with their more privileged peers by the end line one year later.

Table 6.8: Mean school readiness (percentage) scores at baseline and end-line of children by different ECE programmes in Rajasthan

Household characteristics	Type of preschool programme	N	Average score at baseline (%)	Average score at end-line (%)	Average gain from baseline to end-line
Non-general caste, mothers with no schooling, low asset index based on consumer durables and no reading material available at home	Anganwadi	24	21.25	27.39	6.14
	Private preschool	103	30.43	30.43	13.78
	Known practice	34	24.04	47.64	23.60
General caste, mothers with primary and above education, high asset index based on consumer durables and reading material available at home	Private preschool	14	33.93	48.39	14.46

models also confirm that home language as a measure of inequality is significant in Assam.

Overall, based on the number of variables that remain significant in a multivariate framework, the analysis presented here suggests that after taking individual and household factors into account, children's preschool participation in Assam and Telangana is more successful in negating the disadvantages stemming from gender, caste, affluence, mother's education and home language than is the case in Rajasthan.

6.8 Relationship between programme quality and SRS in a multivariate framework

Using the smaller Strand B data set, we carried out regression analysis to understand the effects of different domains of preschool quality on school readiness levels among children, after controlling for type of programme and child and household characteristics.The child and household characteristics are defined in a similar manner as in previously mentioned Strand A regressions (Section 6.7).[46] Scores of different quality domains such as physical infrastructure, availability of learning aids, classroom planning and organization, curricular transactions and teacher disposition, as assessed in ECEQAS, were included in the analysis framework in order to identify which of these domains are associated with better school readiness outcomes of children.[47]

Activities conducted for cognitive development emerged as a significant contributor impacting school readiness levels of children along with physical infrastructure of the centre/school. This indicates that children exposed to a cognitively focused curriculum with emphasis on conceptual understanding through experiential activities do better on school readiness compared to the children who are exposed to more formal reading, writing and rote memorization in preschools. This finding is consistent with that reported and discussed in Chapter 5. It also confirms the understanding, as mentioned in Chapter 1, that the concept of school readiness comprises not only developmental maturation and attitudinal and emotional competence, but also learned behaviours which need to be an essential part of any preschool curriculum (Bowman, Donovan and Burns, 2001).

Physical facilities available in the programme also emerged as a domain impacting school readiness levels in a controlled framework. Physical facilities are defined as a safe and secure building with clean and non-hazardous surroundings and with basic facilities, such as water and toilets. Private preschools were observed to have more of these facilities compared to the other two models.

An important requirement of a preschool, learning and play materials, is observed to have a negative association with children's school readiness levels. This may be a result of low variance, as availability and use of play and learning materials was not observed across the different types of programmes in the three sampled states, except in a small sample from the known practice programme in one state.

After controlling for quality domains, we expected the differences between different types of programmes (Anganwadi versus private, as indicated in Section 6.5) to disappear. But we find that the type of preschool programme (Anganwadi versus private and Anganwadi versus known practice) makes a lot of difference. In particular, there is a significant difference in scores between children attending anganwadis and private preschools. All other factors remaining the same, the children attending private preschools have higher scores than those attending anganwadis. This should not be construed to mean that private preschools offers a better 'quality' preschool programme as they focus on the learning of 3R's and do not have trained teachers. The

[46] The model used for studying the impact of quality of preschools is similar to the one used for the larger sample (Strand A). A state FE model is run to control for state level characteristics. The regression model controls for child characteristics like age and gender, and household characteristics like mother's education, caste, and household affluence; availability of reading materials in the house and support provided by the family members in the learning of the child; and the different types of educational programmes (preschool / primary) attended by the child at age 5. Appendix 6.3 provides the detailed regression results for all states together.

[47] Both Strand A and Strand B regression analyses yield similar results with respect to child and household characteristics- for example, age and household affluence are significant in both the models.

regression results also indicate that the difference in scores between children attending Anganwadis and those attending 'known practice' programmes in Rajasthan is almost the same as that between children attending Anganwadis and those attending private preschools. We already know from Chapter 5 that the 'known practice' programme are markedly different from private preschool programmes in terms of the curriculum followed and the teachers. This suggests that there are other factors besides the classroom quality which seem to be influencing the difference between Anganwadis and private preschools/ 'known practices', which require further enquiry.

6.9 Concluding thoughts

The analyses presented in this chapter establish a strong relationship between children's participation in preschool programmes between the age of 4 years and age of 5 years, on the one hand, and their school readiness levels on the other, although overall, the school readiness levels remain low. In other words, participation makes a difference - children who participate in preschool programmes regularly have greater school readiness levels than their peers who participate irregularly or not at all.

Results from the smaller Strand B data show that along with participation, some of the quality domains as assessed by ECEQAS also help to improve SRS. These are age appropriate curriculum and availability of physical facilities at the preschool.

Analysis of this data does not confirm the expectation that preschool participation reduces the gap between the haves and the have nots in learning, and reveals state level differences in the impact of individual child and household characteristics on school readiness outcomes. It is a matter of concern that we find significant differences in the children's learning by gender in Rajasthan, indicating that gender bias begins much earlier than primary school. The relationship between the mothers' education levels and school readiness outcomes are more pronounced in Rajasthan and Telangana and less in Assam; on the other hand, while the learning gap between children from more affluent households and less affluent households is significant in Rajasthan, it is not so in Telangana and Assam. Strand B data from Rajasthan suggest that better quality preschool ('known practice') programmes can be successful in bridging equity gaps. However, the results should be interpreted with caution because of the limited sample on which the analysis was based.

Chapter 7

Does school readiness impact early grade learning?

Chapter summary

This chapter investigates the impact of school readiness levels and quality of preschool/school facilities attended by sampled children on their early grade learning outcomes.

What is the relationship between school readiness and early grade learning?

- Children with higher school readiness levels at age 5 had better early grade learning outcomes at age 6 across all the three states. Similarly, the school readiness competencies acquired by children at age 5 were significant in determining their early grade learning levels even at age 7 in Assam and Rajasthan. This relationship was significant at age 8 only in Assam.

- Specific school readiness competencies, such as pre-number tasks, sequential thinking, pattern completion, matching numbers, and phonemic awareness, strongly influenced children's early grade learning outcomes in the broad domains of math, language and cognitive ability.

Does the quality of the programme attended by the sampled children also impact early grade learning?

- The analyses in this chapter confirms that the quality of the programme attended by children at ages 5, 6 and 7, as assessed by ECEQAS Plus had a positive and significant association with subsequent learning levels at ages 6, 7 and 8 across all three states.

- Specific domains of programme quality that emerged as significant in influencing learning levels at ages 6, 7 and 8 were physical infrastructure; availability and use of play and learning material; classroom planning; teaching process; and teacher disposition/behaviour.

7.1 Introduction

Chapter 1 summarized key findings from international research showing that when children are 'ready for school', they learn better and their early grade learning outcomes improve. In this chapter, we examine whether this relationship holds true in the context of our sampled children, using data on children's SRS (as measured by the SRI) and early grade learning assessments (described below).

As discussed in the previous chapter, sampled children's school readiness was assessed on two occasions, one year apart – at age 4, and again at age 5. Over the subsequent 3 years, all children – barring a small percentage – of entered the formal school system. Regardless of their enrolment status, they were tested on age appropriate skills and concepts during each of these 3 years. Referred to as the Early Grade Assessments (EGA), these assessments were conducted in October-December each year in 2013 (approximately at age 6), 2014 (at age 7) and 2015 (at age 8).

Given that the length and nature of sampled children's exposure to preschool and/or primary school varied enormously during the first two years of the study, the EGA tools were designed to be age, rather than grade, appropriate, and assessed children on slightly more complex and formal concepts in the areas of cognition, emergent and early math, and emergent and early literacy and language. Table 7.1 summarizes the domains that were included in all early grade assessment tools.[48] These were progressive in nature, with the level of difficulty increasing for some items in each successive year, while still keeping some common items in order to enable comparisons over time.

In order to ensure standardized administration and reporting, the assessment tools used with the large sample of children (Strand A) were a subset of those used with the smaller sample (Strand B), which had some additional items that assessed higher order cognitive skills and conceptual understanding. We begin by presenting Strand A assessment results which are representative of the districts where the survey took place. Later, we examine findings from the smaller but more in-depth Strand B analysis, focusing on the relationship between the quality of the primary grades programmes attended by children over three years and their learning levels as assessed by the EGA.

In each EGA round, children were tested one-on-one by trained investigators. The testing process took an average of about 35-40 minutes per child. Investigators ensured that testing was conducted in a quiet setting with minimal interference, and they spent 5-10 minutes interacting with the child to make him/her feel comfortable before beginning the assessment. Across the study locations, 9,221 children were tested in 2013, 8,999 in 2014 and 8,845 in 2015 under Strand A. A total of 7,636 children were administered the school readiness assessment at age 5, as well as all three early grade assessments.[49]

Table 7.1: Domains included in early grade assessments (2013, 2014, 2015)

Domains	Skills/Competencies
Cognitive ability	Classification, colour and shape identification, problem solving, memory, seriation, logical reasoning, sequential thinking, number conservation
Reading readiness and language	Book handling, picture description, letter recognition, word reading and picture matching, matra word reading, ability to read and comprehend text (Grade 1 and Grade 2 level)
Emergent math and numeracy	Number counting and matching, number recognition (single, two digit, three digit), word problems (addition and subtraction), numeric operations (simple addition, addition with carry over, simple subtraction, subtraction with borrow, multiplication, division)
English	Letter recognition, word reading with meaning, simple sentences with meaning

[48] For item wise details of the tools and scoring used each year by both strands, refer to Appendix 7.1 and 7.2.
[49] The breakdown by individual states is: 3,196 in Rajasthan, 2,092 in Telangana and 2,348 in Assam.

7.2 Early grade tasks: How do children perform?

Acquisition of early math skills

A number of broad categories were included in all three assessments to test children on early math skills (Figure 7.1). Data indicate that at age 6, about 64 per cent children were able to recognize single digit numbers. As children get older and enter formal schooling, it is expected that they would progress further in learning and understanding the concept of numbers. However, at age 7, only 46 per cent children were able to recognize two digit numbers while at age 8, just 38 per cent were able to recognize three digit numbers. These findings corroborate evidence from a growing number of sources showing that learning deficits begin early and accumulate over time – the annual ASER survey data key among them (ASER Centre, 2006-17). At the same time, children in this age group are expected to be in school and following a curriculum that assumes mastery of content taught the previous year and increases very quickly in terms of the complexity of what children are expected to understand and do.

Children were also tested on basic addition and subtraction concepts. Figure 7.2 shows how children progressed on these tasks. A look at the graph shows that, although the proportion of children who could solve simple one digit numeric addition and subtraction sums grew each year, overall the levels were very low overall. Even at age 8, almost 4 out of every 10 children could not do addition and 5 out of every 10 could not do subtraction – perhaps not surprising given that they were still struggling with both reading and number recognition.

The data suggest that at all ages, children find word problems easier to solve, compared with numerical sums. Field investigators orally asked one addition problem and one subtraction problem. During the

Figure 7.1: Performance of children on early math skills (% of children)

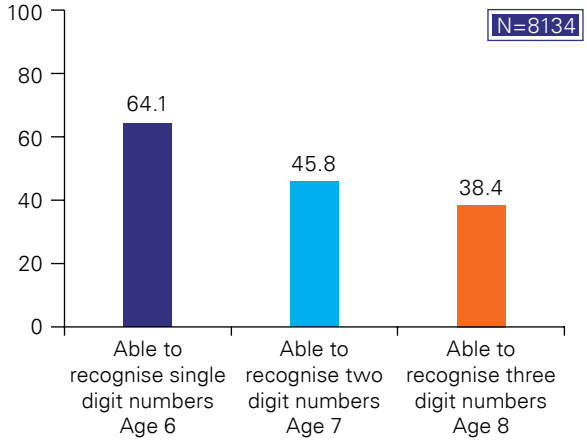
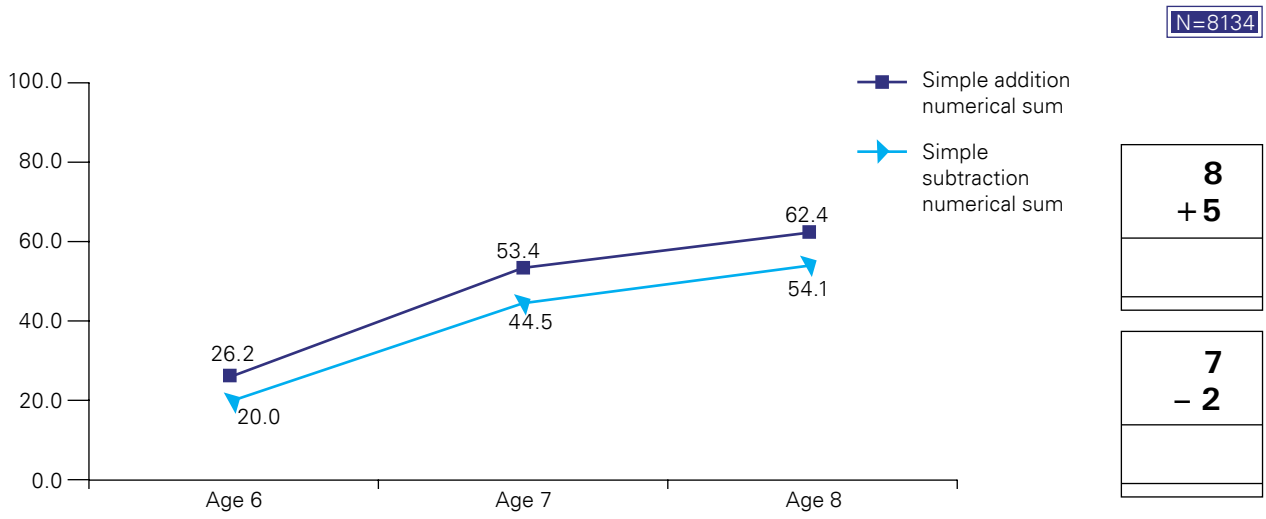


Figure 7.2: Performance of children on numerical sums (%)



third early grade assessment round at age 8, for example, these were: "*You have 6 pencils and your mother gives you 7 more. How many pencils do you have now?*", and "*You have 9 toffees and you give 2 to your friend. How many toffees do you have now?* At age 6, about 50 per cent were able to do these oral word problems while only 20 per cent were able to solve numerical sums of the same difficulty (single digit problems). At age 7, about 70 per cent were able to do the addition word problem as compared to 53 per cent who could solve the equivalent numeric problem.

These findings have major implications for the design of the early grade language, reading comprehension, and math curriculum, discussed in Section 7.5 to follow.

Acquisition of early language and literacy skills

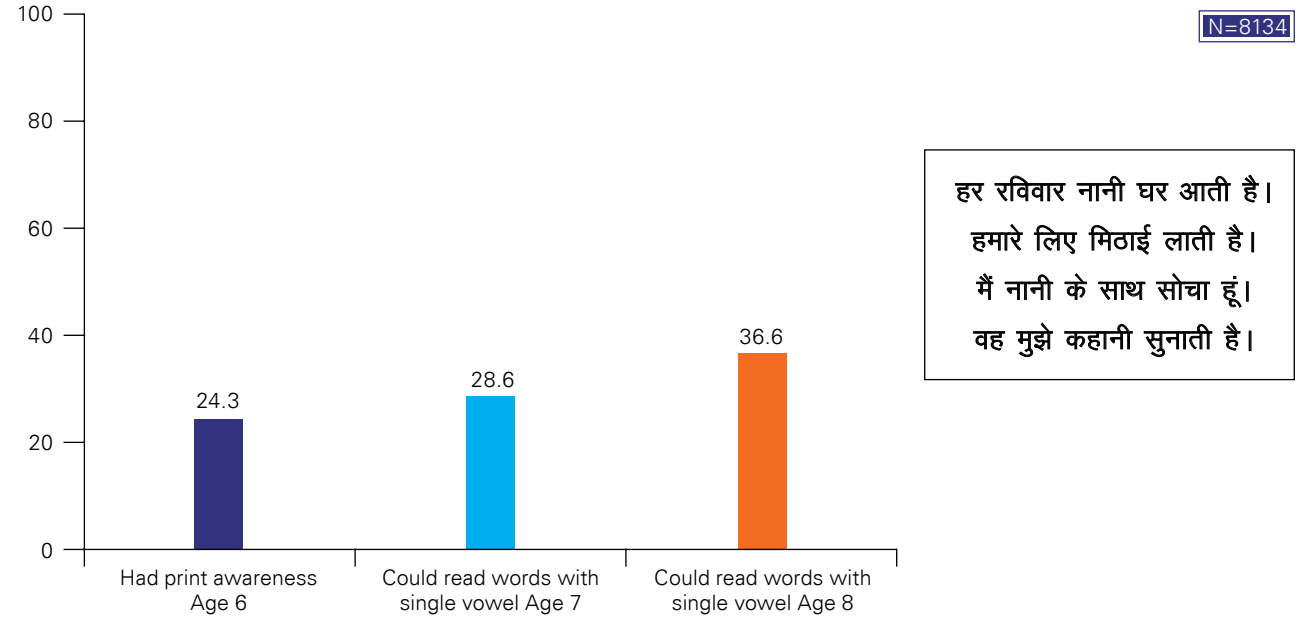
A number of tasks related to early language and literacy were included in the three assessment rounds at ages 6, 7 and 8.

Print Awareness tested children's book handling ability at age 6. Children were given a book and were asked to identify the front cover of the book, indicate the page where the text began, and tested on their knowledge of page turning. Only 24 per cent children in the sample (N=8,134) were able to complete all three parts of the task correctly.

For testing *reading ability*, a simple four-line text (Figure 7.3) was shown to the child. The child was marked as 'could read' if s/he could read the text fluently with 3 or fewer mistakes. Only one out of every three children was able to read this simple text by age 8.

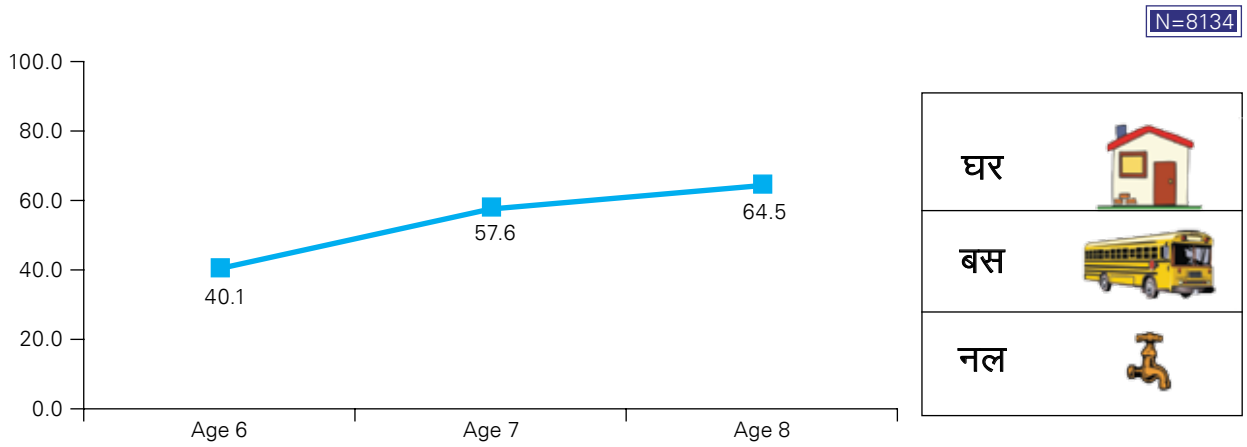
Children were also tested on their ability to read simple words as well as words that had a single '*matra*' or vowel sound. Their knowledge of simple words was tested through a task where they were shown these words and were given picture cards. Once they read the words, they were asked to match the words with the respective pictures to assess comprehension skills. Figure 7.4 shows the progress of children on this task over the years, along with a snapshot of the task at age 6 and age 7.[50] These data indicate that children's ability to read and comprehend simple words and their meanings is quite deficient. At age 6, about 40 per cent were

Figure 7.3: Performance of children on early reading skills (%)



[50] The difficulty level was increased for assessment at age 8 where 5 words and 6 pictures were shown to the child.

Figure 7.4: Performance of children on reading words and matching with pictures (%)



able to do the task. The percentage increases to 64 per cent by age 8. These proportions are very low relative to curriculum expectations.

7.3 Does school readiness improve early grade achievement?

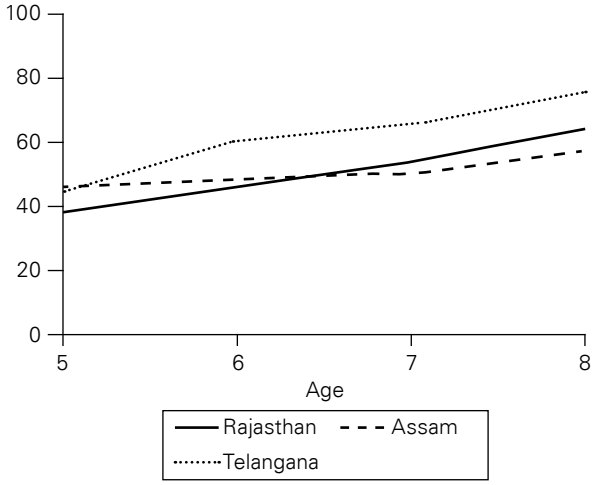
Preceding sections of this chapter provided an overview of the domains that were tested in each round of early grade assessment, as well as examples of specific test items and how children's performance on these evolved over time. We now turn to an examination of whether children's school readiness, measured by the SRI (see Chapter 6), influenced their performance on these early grade assessments.

The correlation matrix in Table 7.2 confirms that, for the sample as a whole, school readiness has a positive and significant correlation with early grade learning at ages 6, 7 and 8. That is, children with high scores on the SRI also did well on these early grade assessments, and children who scored low on the SRI scored low on the early grade assessments as well. As one might expect, the correlation between SRS and early grade assessment weakens as children get older – that is, with each successive assessment round. For all states taken together, the correlation is highest at the assessment round carried out when sampled children were age 6 (0.45), followed by age 7 (0.40) and age 8 (0.36).

Table 7.2: Mean scores and correlation coefficients of SRS at age 5 with EGA scores at age 6, age 7 and age 8

State	Mean School Readiness Score (Age 5)	Early Grade Assessment (age 6)		Early Grade Assessment (age 7)		Early Grade Assessment (age 8)	
		Mean	Correlation coefficient	Mean	Correlation coefficient	Mean	Correlation coefficient
Assam	46.10	48.90	0.40	50.27	0.37	57.31	0.35
Rajasthan	38.20	46.41	0.67	54.06	0.60	64.10	0.53
Telangana	44.87	60.81	0.18	65.62	0.18	75.76	0.16
All states	**42.51**	**51.32**	**0.45**	**56.25**	**0.40**	**65.42**	**0.36**

Figure 7.5: Mean percentage scores across assessment rounds, by state



The table also shows that the relationship between school readiness and subsequent learning is not the same across states. Overall the correlation between the two is strongest in Rajasthan, followed by Assam. It is the weakest in Telangana. This is illustrated in Figure 7.5, which plots the mean percentage scores at end-line school readiness assessment at age 5 and each of the early grade assessment at age 6, age 7 and age 8, separately for each state[51] and shows that the relationship between school readiness and early grade learning, as measured by these tools, is not the same across study locations. In other words, it is not the case that the state where children scored highest on the school readiness assessment at age 5 also had the highest early grade learning scores at age 6, 7 and 8.

For example, although children in Telangana started out with school readiness levels that were almost the same as their counterparts in Assam, their abilities and skills grew more rapidly over the next three years, such that by age 8 their mean early grade achievement score was 18.5 percentage points higher. Similarly, we see that sampled children in Assam started out with the highest mean SRS at age 5, but ended three years later with the lowest mean achievement scores at age 8. These two contrasting situations indicate that there are factors other than school readiness at play in Telangana which help to improve children's learning levels, while in Assam other factors are at play that diminish the ability of children in Assam to achieve high early grade assessment scores.

7.4 Relationship between school readiness and early grade learning in a multivariate framework

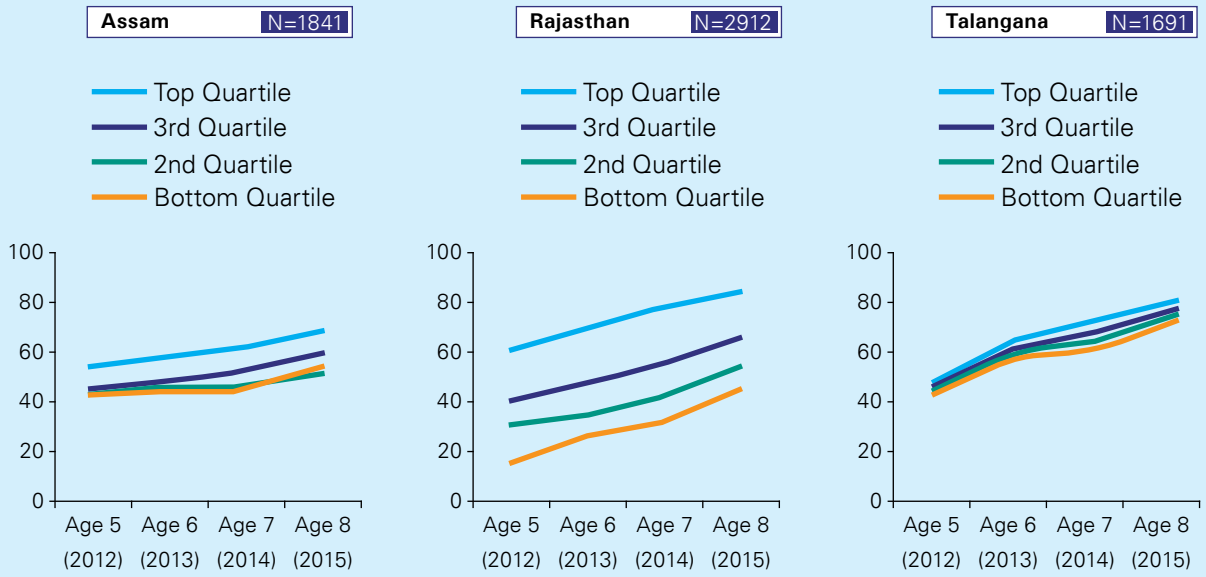
So far, we have discussed the "uncontrolled" relationship between school readiness and early grade learning, that is, the analysis did not factor in other elements that we might expect to influence children's learning trajectories. We now turn to an examination of the relationship between school readiness and early grade learning in a multivariate regression framework. Similar to our analysis in Chapter 6, we ask: does the positive relationship between school readiness and early grade assessment scores hold when we take children's individual, household, and participation characteristics into account? Let us return once again to our two imaginary children of the same age and gender, with same level of preschool and primary school exposure and residing in the same state. They have similar participation, household and other background characteristics such as caste, economic affluence, and exposure to reading materials within the household. In this hypothetical scenario, is it the case that the child with higher school readiness score has higher scores in the various early grade assessments?

Multivariate regression analysis helps us to answer this question,[52] and broadly confirms the results

[51] Distributions of early grade scores at age 6, 7 and 8 are provided in Appendix 7.3 separately for each state.

[52] The outcome variables in these regression models are the early grade assessment scores. We run separate models for each of the early grade assessment scores at age 6, age 7 and age 8. Control variables in the models are the individual characteristics (age, gender, current grade), household characteristics (mother's education, caste, household affluence, whether the household has reading materials), participation characteristics (count of the number of exposures to preschool and primary school and observed attendance) and SRS at age 5. In addition to the standard OLS model, we run a state FE model to take into account state level factors that might affect the relation between school readiness and early grade assessment scores. We expect the coefficient for early grade learning score at age 4 to be positive and significant in both the OLS and state FE models. We also expect the strength of the coefficient to reduce as we move across the assessment rounds- that is, the coefficient will be strongest for assessment carried out at age 6 and weakest for assessment carried out at age 8. Details are provided in Appendix 7.4.

Is school readiness important for early grade learning?



In the graphs shown above, sampled children are divided into quartiles based on their SRS at age 5. The average percentage scores for children belonging to these four quartiles are then plotted for each subsequent round of early grade assessment (at age 6, 7 and 8).

These data illustrate two major conclusions.

First, in all three states, children's school readiness at age 5 determines their performance relative to their peers in subsequent years. With a single exception in Assam, the lines on these graphs do not intersect, meaning that children whose school readiness levels are low never catch up with their peers: they continue to have the lowest performance on early grade achievement at age 6, 7 and 8. Similarly, children who had the highest SRS continued to have the highest early grade achievement scores at age 6, 7 and 8.

Second, there are enormous differences across states in children's learning trajectories. Among children in Rajasthan, substantial differences are visible in school readiness levels at age 5: the gap between mean scores of children in different quartiles is large (lines are far apart). In Assam, children start out with less variation in school readiness (lines are closer together). In Telangana, there is almost no difference between children with the highest and lowest SRS (lines are very close together).

Although this analysis does not take into account other factors influencing children's learning achievement, it does indicate importance of school readiness for early grade achievement in all three states.

from the descriptive statistics presented above. On average, in a multivariate framework where we control for individual, household, and participation characteristics as well as for state level variation, a one percentage point increase in SRS leads to a 0.346 percentage point increase in the EGA score at age 6, and to 0.105 percentage point increase in EGA score at age 7. SRS at age 5 does not have a statistically significant relation with the EGA score at age 8 (Table 7.3 and Appendix 7.4).

Table 7.3: Coefficients for end-line SRS in a controlled regression framework for all states together

	State FE	OLS
EGA at age 6	0.346***	0.364***
EGA at age 7	0.105***	0.0978***
EGA at age 8	Not significant	Not significant

Note: *** p<0.01, ** p<0.05, * p<0.1

Results in Table 7.3 suggest that state level differences are critical, motivating further analysis at the level of individual states. Separate state-wise regressions confirm the importance of SRS for early grade assessment scores at age 6 in all states (Table 7.4 and Appendix 7.5). However, the relationship is less straightforward at ages 7 and 8. At age 7, the relationship remains significant in Rajasthan and Assam and at age 8, it is significant only for Assam. Overall, the size and significance levels of coefficients for end-line SRS at age 5 in the regression analysis confirm, as do simple descriptive statistics, that the relationship between school readiness and early grade achievement is weakest for Telangana and strongest for Assam, even after considering the fact that sampled children in Assam stayed longer in preschool (see Chapter 4).

Multivariate analysis[53] from Strand B broadly confirms the significant association between children's school readiness at age 5 and their subsequent learning levels at age 6, 7 and 8 (Table 7.5).[54] The coefficient for the school readiness scores at age 5 is significant for EGA scores at all ages, including at age 8. The findings also indicate that the impact of school readiness decreases over time across all three states. In further state-wise regressions controlling for child factors, household factors and the type of programme attended by the child, school readiness continues to be a significant contributor to EGA scores at age 6, 7 and 8 across states except in Rajasthan at age 8.

Table 7.4: Coefficients for end-line SRS in a controlled regression framework for individual states

	Assam	Rajasthan	Telangana
EGA at age 6	0.287***	0.614***	0.093**
EGA at age 7	0.153***	0.0792***	0.0322
EGA at age 8	0.0522**	-0.00441	0.0171

Note: *** p<0.01, ** p<0.05, * p<0.1

[53] As with the analysis done using Strand A data, the dependent variable in the regression models are early grade assessment scores at age 6, 7 and 8. Separate regression models are run for each of the early grade assessment to estimate the association between SRS at age 5 with early grade assessment scores at different ages. Independent variables controlled in the models are child characteristics (age, gender and grade attended by the child at the time of assessment); household characteristics (mother's education level, caste, household affluence calculated in terms of availability of consumer durables; learning environment at home measured in terms of availability of reading material and family support for learning); participation characteristics from age 4 to 5; type of programme attended by the child at the time of assessment; SRS at baseline (age 4) along with the previous year assessment score. In addition to the standard OLS model, a state FE model was also run to take into account state level factors that might affect the relationship between school readiness and early grade assessment scores. Details are provided in Appendix 7.6 and 7.7.

[54] The discrepancy between Strand A and Strand B results are on two counts: the relationship between SRS at age 5 and EGA score at age 8 when all states are analysed together and for Telangana when state specific analysis is carried out. In case of Strand A, it is not significant in either scenario, while it is significant when analysis is done using Strand B data. Part of the reason behind this discrepancy may be that the tools used by Strand B are more detailed and contain additional items to evaluate children's early grade learning.

Table 7.5: Coefficients for SRS at age 5 in a controlled regression framework for Strand B sample

			Assam	Rajasthan	Telangana
	State FE	OLS			
EGA at age 6	0.287***	0.293***	0.324***	0.322***	0.324***
EGA at age 7	0.276***	0.283***	0.188***	0.194***	0.372***
EGA at age 8	0.0966***	0.0658***	0.135***	0.0421	0.107***

Note: *** p<0.01, ** p<0.05, * p<0.1

It is important to note that these analyses do not factor in the quality dimensions of programmes attended by children, either at the preschool or at the primary school stage. The question of whether programme quality makes a difference is addressed separately in Section 7.6.

7.5 How do specific readiness competencies influence children's subsequent learning outcomes in early grades?

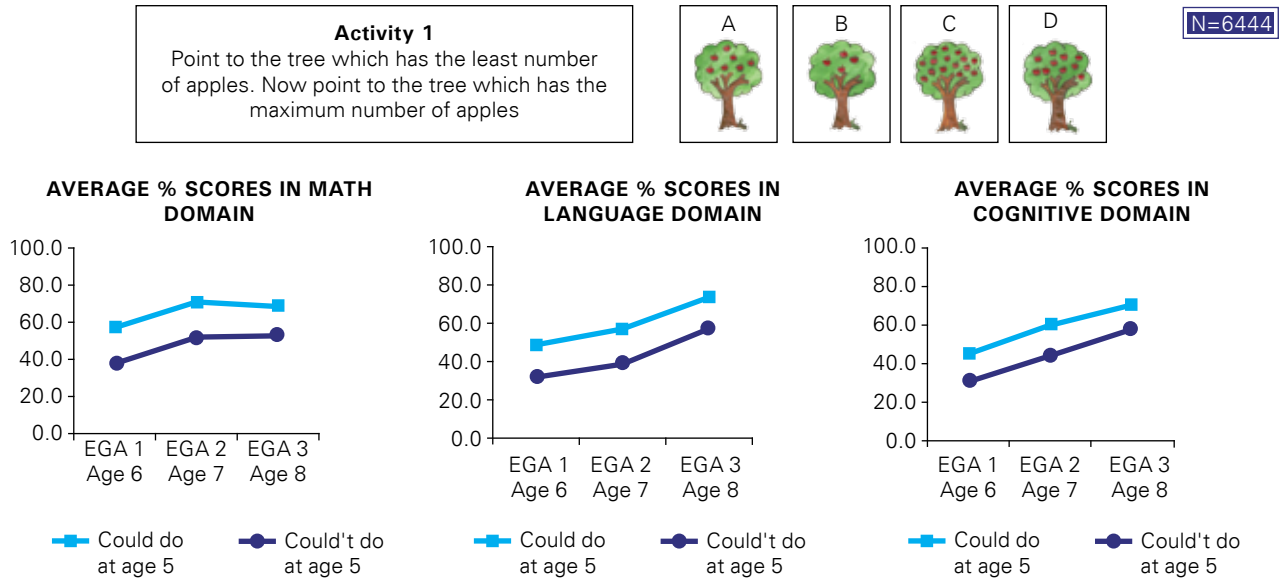
Although sampled children performed poorly in both school readiness and early grade assessments, preceding sections showed that children with relatively better overall SRS performed better in later years on early grade assessments. We also saw that, though significant, the impact of school readiness decreases as children grow older. We turn now to an exploration of the relationship between specific school readiness competencies and children's later learning outcomes in the broad domains of math, language and cognitive ability, as well as some specific tasks from early grade assessments.

To do this, we select three tasks from the school readiness assessment discussed in Chapter 6: the items testing pre-number concepts, sequential thinking, and number matching. For each item, we divided sampled children into two groups: those who *"could do"* and those who "*could not do"* the task at age 5. We then looked at how each group of children – those who could do the task, and those who could not – performed on the early grade math, language, and cognitive items tested in the subsequent early grade assessments.[55]

Figure 7.6 summarizes these results for the pre-number task, which involved identifying the picture of a tree with more or fewer apples than the other tree. These data show that the "could do" group – children who were able to do this task at age 5 – achieved higher average percentage scores in all three domains of early grade learning (math, language and cognitive ability); and further that this relative advantage persisted over the following three years. The difference in scores of the two groups is significant at 0.5 per cent (See Appendix 7.8 and 7.9).

[55] Appendix 7.8 and 7.9 provides similar analysis for the remaining school readiness tasks tested.

Figure 7.6: Relationship between pre-number task from school readiness assessment and early grade learning domains



Similar results were obtained for the school readiness tasks of sequential thinking and matching numbers. The sequential thinking task required children to organize a set of four cards in the correct sequence (Figure 7.7) and the matching numbers task required them to match single digit numbers to pictures containing the equivalent number of objects (Figure 7.8). In each case, the group of children who '*could do*' the task at age 5 scored higher on all three early grade learning domains (math, language and cognitive) than the group who '*could not do*' the task. In each case, this relative advantage persisted over the three subsequent years. Children who had not acquired these readiness skills at age 5 were unable to catch up with their better-prepared peers later on.

Figure 7.7: Relationship between sequential thinking task from school readiness assessment and early grade learning domains

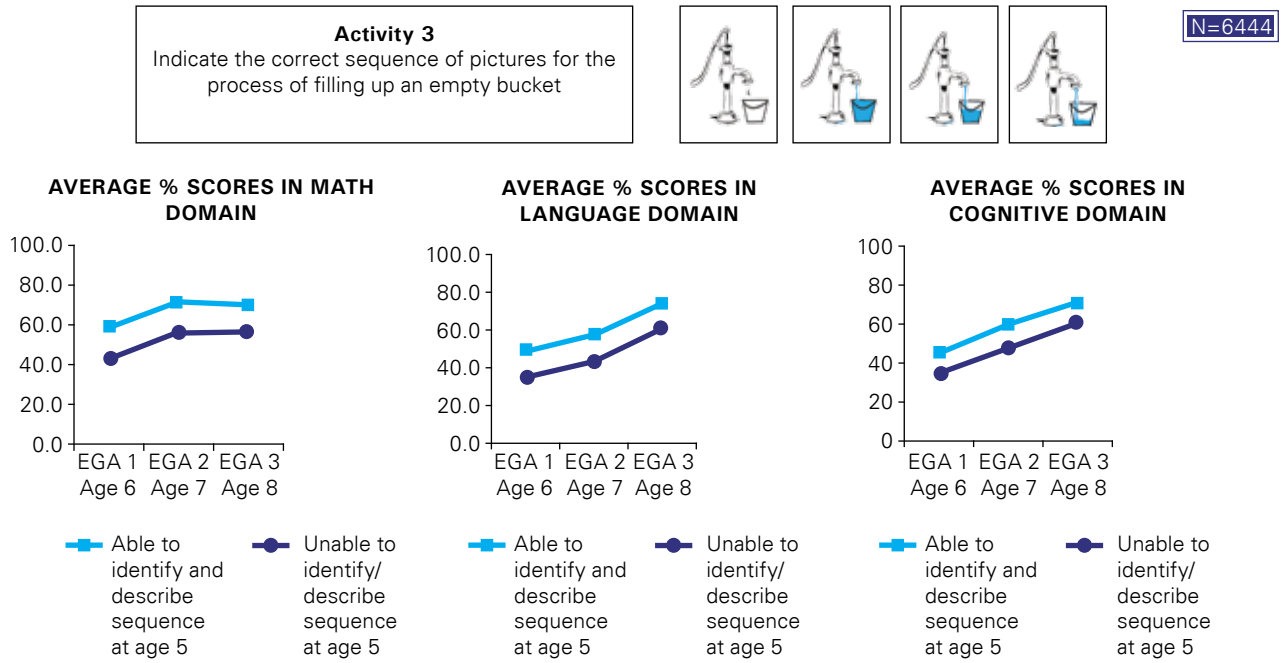
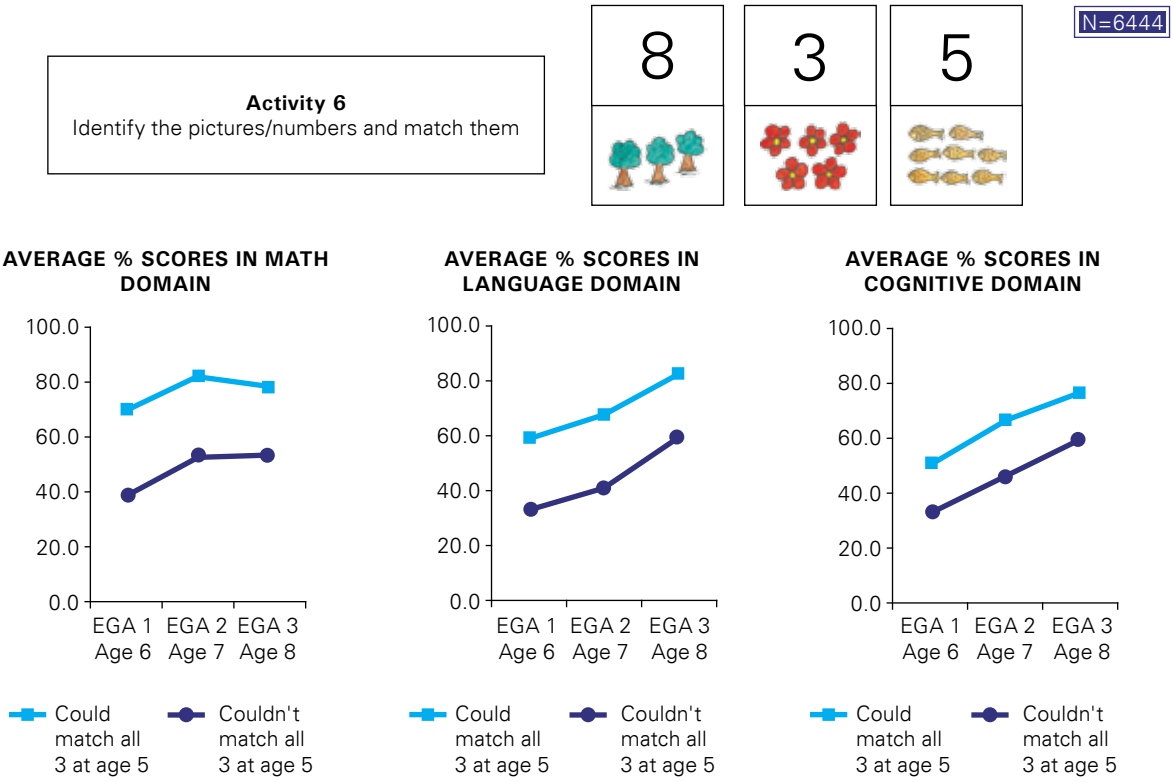


Figure 7.8: Relationship between number matching task from school readiness assessment and early grade learning domains



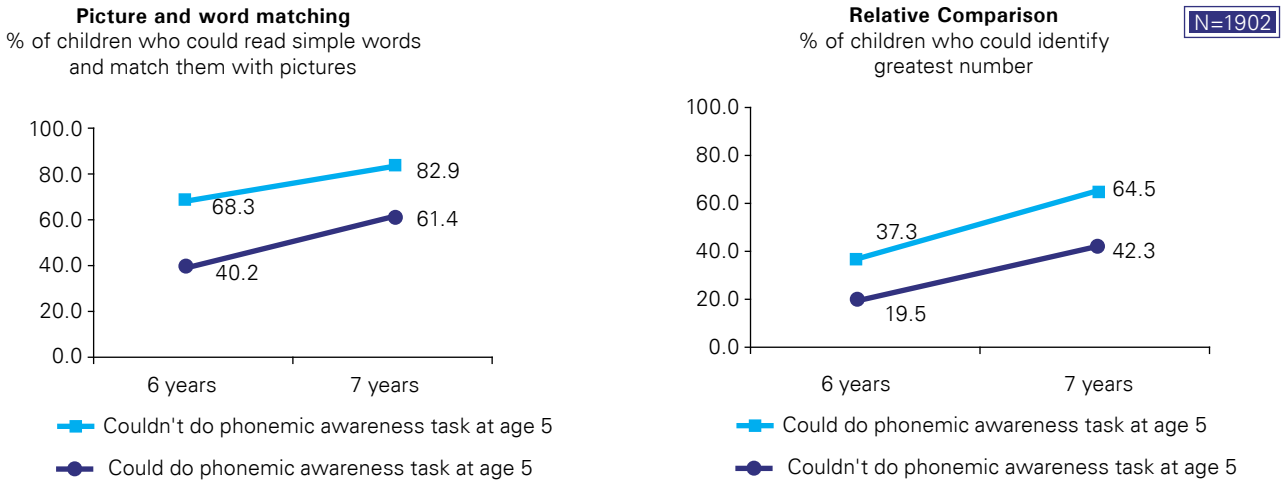
Given that school readiness outcomes at age 5 make a difference in overall math, language and cognitive domains, we delved deeper into these domains and looked at the associations between specific school readiness tasks and conceptual tasks assessed in the early grade assessment tools used in Strand B with a smaller sample (N=1,902). For this analysis, two items assessing pattern completion and phonemic awareness from the SRI were mapped to conceptual items in math and language domains in the early grade assessment at age 6, 7 and 8.

Phonemic awareness is considered to be a prerequisite for reading. Hence, the performance of the children on this task was mapped on to their reading ability at age 6 and 7. As described in Chapter 6, this item emerged as one of the most difficult ones for 5-year-olds, and only 15 per cent of children were able to do it.

To test reading ability, children were presented with 5-6 simple words like *ghar* (house), *nal* (tap), *mala* (garland), *papita* (papaya) along with their pictures, and were asked to read the word and match it with the respective picture (the number and the words varied in the two assessment tools).

Figure 7.9 shows that a higher proportion of children who were able to do the task on phonemic awareness were also able to read words in context. As this language readiness task was expected to affect not only the language but also the math domain, children who had some understanding of phonetics and those who did not were mapped on how they performed on a task on number comparison. In this task, the children were shown four double digit numbers and asked to identify the greatest number. As evident from the graph, a higher percentage of children who could do the task on phonemic awareness were able to complete the task on number comparison, where out of a given set of numbers, children were asked to point out the greatest number.

Figure 7.9: Performance of children in early grades based on their performance on a phonemic awareness task

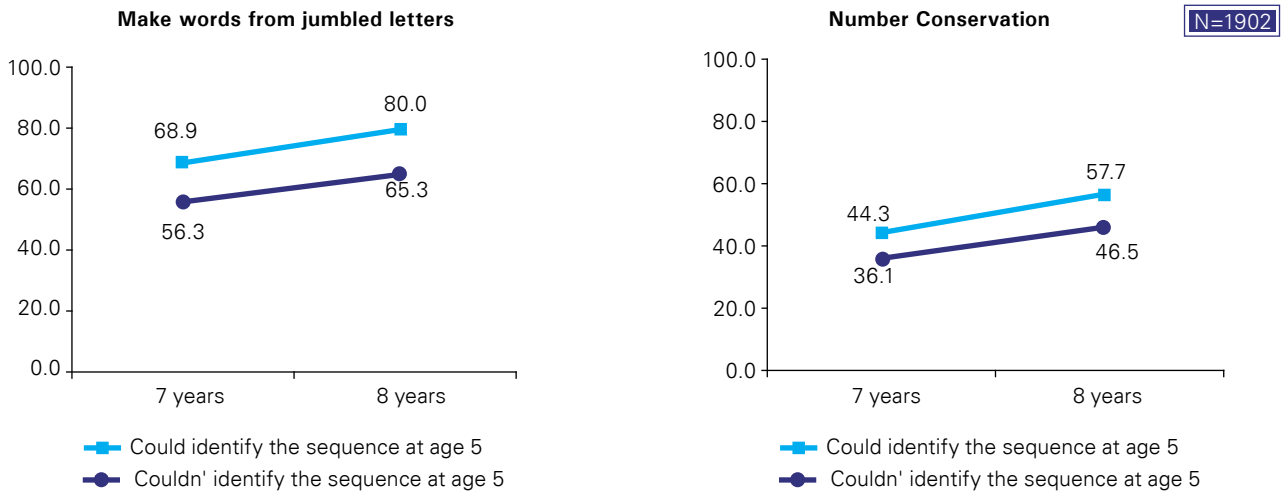


Similar analysis was done using the school readiness competency of *"pattern completion"*, where children were given an incomplete pattern to complete using cut outs. Children who could complete the task successfully and those who could not do so were separately mapped on how they performed on the Piagetian tasks of number conservation and making simple words from letters as given in the Strand B early grade assessment tool for 7- and 8-year-olds.

Pattern completion is a logical reasoning task where the children are expected to see the association between unrelated items (different shapes and colours in this specific task). This competency helps children in language and math domains in later learning when they are expected to derive and understand relationships and classify information.

In the task on number conservation, a child's ability to understand that redistributing material does not affect its mass, number, volume or length was assessed. The task on number conservation falls under the category of concrete operational stage (7 to 11 years), according to Piaget's theory of cognitive

Figure 7.10: Performance of children on making words and number conservation based on their performance on a sequential thinking task



development. The stage is characterized by the development of organized and rational thinking. The task emerged as a difficult item for children even at age 8, with only half of the sample achieving the competency.

Figure 7.10 shows the performance of children on word making and number conservation tasks at age 7 and 8, based on their performance in the school readiness task on "*pattern completion*". This mapping shows that a higher percentage of children who could complete the task on pattern-making at age 5 demonstrated understanding of these tasks at age 7 and 8.

The above analysis provides clear evidence that children's performance on SRI items impacts their learning levels across domains and specific conceptual competencies at ages 6, 7 and 8, as the school readiness skills assessed are expected to facilitate higher order thinking and are generic rather than specific to language or math domains.

7.6 What quality factors in early primary grades improve early grade learning?

Strand B aimed to estimate the impact of the quality of programmes attended by 5- to 7-year-old children on their learning levels, for which the programmes attended by the smaller Strand B sample were comprehensively assessed on quality dimensions through ECEQAS Plus. Chapter 5 analysed the quality of classroom exposure that sampled children received at different ages. Overall the quality scores were found to be low across models and states, with some exceptions.

In this section, we further attempt to understand whether the quality of programmes attended by 5-, 6- and 7-year-olds impacts their subsequent learning levels at ages 6, 7 and 8, respectively. For this purpose, separate regression analyses were carried out for 6-, 7- and 8-year-olds, controlling for child and household characteristics,[56] which confirm that the quality of the programmes attended by children at ages 5, 6 and 7, as assessed by ECEQAS Plus, has a positive and significant association with subsequent learning levels at ages 6, 7 and 8 in an OLS framework (Table 7.6). But when state variations are controlled for, the quality of programmes does not appear significant at age 6.

Table 7.6: Coefficients for quality of programme attended by children (ECEQAS Plus score) in a controlled regression framework for Strand B sample across different states

	State FE	OLS
EGA at age 6	0.114	0.308**
EGA at age 7	0.281**	0.219*
EGA at age 8	0.288**	0.433***

Note: *** p<0.01, ** p<0.05, * p<0.1

In order to identify specific quality indicators that impact the learning levels of children, the analysis was rerun after controlling for the state variations and substituting the overall ECEQAS Plus scores in the regression framework, with domain-specific scores for physical infrastructure, facilities available in the school, availability of outdoor space, play and learning aids, classroom planning, classroom arrangement and management, curricular transaction (activities for development of different domains, teaching processes, assessment and monitoring) and teacher disposition.

The analysis identifies specific domains of programme quality that impact learning levels of children at ages 6, 7 and 8 years. These include physical infrastructure, availability and use of play and learning material, classroom planning, teaching processes and teacher disposition/behaviour, all of which emerged as significant predictors of learning levels at these ages. However, age specific analysis revealed inconsistent trends, possibly due to the fluid, multi-age composition of primary classrooms as discussed in previous chapters, making age an invalid criterion in this analysis.

In descriptive terms what these findings reveal in a controlled framework is that children had better learning levels when they attended programmes

[56] The child and household characteristics are defined in a similar manner as in previously mentioned in Strand A regressions (Section 7.5). Details are provided in Appendix 7.10.

where the teacher plans before class, keeping individual needs and abilities in mind; follows a routine/schedule/timetable; provides opportunities to children to experience concepts through activities of their interest; introduces concepts through innovative methods; and encourages and asks questions within a friendly and democratic classroom environment. Programmes where adequate and appropriate activity based learning materials were available and used by the children positively influenced their learning levels. The significant impact of exposure to workbook, reference books for teachers and classroom and and school libraries was also observed. Physical infrastructure of the school, defined as the safe, clean surroundings of the school/centre, also had a positive impact.

In summary, the analysis in a controlled framework shows that the quality of programmes attended by children do influence their subsequent learning levels and points to the need for continuity in pedagogical methods and curriculum from the preschool to primary stages for a more sustained impact and for a sound foundation for children's learning.

Chapter 8

In conclusion

In this five-year-long study we set out to understand young children's early education trajectories in rural India, about which very little was known. We examined the extent to which children below six years of age have access to preschool education; the quality of early learning experiences available to them through the programmes they access, public or private; and the pathways they follow as they move from preschool into primary education. We also assessed whether and to what extent these preschool experiences enable them to develop a sound foundation for later success in the early grades of primary school. This longitudinal study was guided by international research in this area and by the policy and curriculum framework supportive of ECCE in India.

We followed a cohort of children for four years, from the preschool stage at age 4, through the early grades of primary school till age 8. To capture as much diversity as possible, this large cohort of 14,000 children was selected from three major Indian states that are very different from each other on a range of social, economic, geographic and educational indicators and are located in different regions of the country. While the major part of the cohort was randomly selected to ensure representative estimates of participation and learning, a smaller proportion was selected purposively to delve more deeply into dimensions of quality of early education offered to children and its impact on their school readiness and learning in early grades. In addition, we conducted a qualitative study of nine known preschool practices in different states to derive lessons for the larger system.

In this chapter, we summarize major findings from this longitudinal research, the first of its kind in India; identify and discuss some emerging issues and their implications; and conclude with key recommendations for policy and provisioning for these critical early years of childhood.

8.1 Major findings

A. Access, equity and participation in ECE

1. ECE provisioning is near universalization across India.

Every one of the 376 villages sampled for this study had at least one preschool facility for children below six years. The majority of villages had many more than one. Every village had at least one Anganwadi run under the ICDS of the Government of India, and over half also had at least one privately managed preschool (although differences were visible across states).

2. Private provisioning is rapidly expanding across rural India

This phenomenon was visible across the three states, but in varying degrees. It was most evident in Rajasthan, with a majority of villages hosting more than one composite private school with preschool sections attached to it. In Telangana, the spread was more diverse; with better road connectivity many young children were observed commuting to preschools even outside their own villages in transport provided by the school. In Assam, private sector presence was comparatively low, but growing, and often seen in the form of a chain of schools established in more than one district.

The two major providers of ECCE in India are thus the ICDS programme of the government, which is near universal in coverage, and the rapidly expanding private sector. The extent of coverage, in terms of the availability of preschool facilities, is undoubtedly an enormous accomplishment for a country as large and diverse as India.

3. Approximately 70 per cent of sampled children were attending a preschool at age 4.

Most sampled children were attending a preschool at age 4, whether government-run Anganwadis or privately managed preschools. These figures are not dissimilar to those reported elsewhere.[57] Today preschool facilities are easily accessible to most families, and parental willingness to enrol their children is also high. Again, there were state differences with Rajasthan having the highest proportion of children not in preschool at age 4.

A major gap observed was the near absence of participation of children with special needs. Addressing issues of access for these special focus groups and improving the quality of the existing preschool programmes to maximize long term benefits to children emerges as the next major step.

Despite various incentives being offered by the government system in terms of free mid day meals, uniforms, etc., parental preference was largely for the private sector. Parents were willing to pay fees for what they considered 'better quality' and for English medium education. There was clear dissatisfaction with the government provisions due to lack of infrastructure, teachers and accountability. Gender differentiation was significant, with more girls found in government facilities.

These findings are similar to existing research in the primary education sector. Issues of social inequity are thus evident right from this early stage of children's lives, with parallel systems of education emerging, and girls and children from economically disadvantaged families constitute the dominant clientele for government provisions.

4. Children do not necessarily follow the prescribed linear age-based trajectory between age 3 and 8 years. Instead they adopt a variety of pathways with participation stabilizing only by age 8.

The common assumption that children across the country follow a linear trajectory, entering the same grade at the same age, does not match with ground realities. As a result, mixed-age classrooms are the norm rather than the exception, as has been documented year on year by the ASER survey. Further, because large proportions of children enter primary school early, there is an enormous mismatch of age and developmental capability with curricular expectations for many children.

This study shows that children adopt a variety of pathways within and across preschools/schools. On the one hand, a significant proportion of children begin Grade 1 at age 4, well before the official age of entry into school; this trend was observed mainly in Rajasthan and Telangana. On the other hand, many children in Assam continued to attend Anganwadis even at the age of 6 or 7 years. There were also instances of children moving from preschool to primary grades and back again, and/or moving back and forth between government and private schools. This state of flux was observed across all three states; it was only by age 8 that primary school enrolment stabilized at over 90 per cent across the sample.

[57] Annual Status of Education Report (2005-2016) reports each year on the proportions of children in the 3-6 age group enrolled in preschool in rural India, by management type, separately for each state and overall.

This status is a clear violation of the policy prescriptions for age appropriate enrolment. The National ECCE Policy (2013) specifies that children should participate in a preschool or Anganwadi from age 3 to 6 years, at which point they should enter Grade 1 of primary school as per the RTE Act (2009). However, state policies themselves do not reflect these age and developmental milestones. Across the three sampled states, as per state education guidelines the official entry age to Grade 1 is 5 or 5+ years, rather than the prescribed age of 6 years. This is seen to be the pattern across 23 out of India's 29 states (Sood, 2008).

Given the rapid pace of brain growth and overall development of the child in the early years, a difference of even a few months is significant. The curriculum for Grade 1 is designed with the assumption that children will be over 6 years old. This trend of officially advancing the entry age for Grade 1 to below 6 years defies this assumption and can pose significant maturational impediments for children's cumulative learning. Evidence suggests that parents and even schools themselves may be unaware of these implications.

B. Preschool participation and school readiness

Findings with regard to the theme of school readiness, which was the main focus of our study, are presented together below and subsequently discussed, in order to derive a fuller understanding of what emerges from the data.

5. Across states, school readiness levels at the time of school entry at age 5 states far below expectations in cognitive and language domains, although relatively better in the psycho-social domain.

6. Preschool participation from age 4 to 5 years has a significant impact on children's school readiness levels at age 5+. Children participating regularly had higher school readiness levels than their peers who participated less regularly. Within the quality domains, the study found that children who were exposed to activities for cognitive development scored better in the school readiness assessment.

7. The levels of school readiness attained at age 5+ in turn demonstrate a significant association with learning levels in early grade assessments, although the magnitude of this impact tapers over time.

8. Individual and household factors emerging as significant for influencing school readiness levels in children at age 5+ include (a) age of the child, (between ages 4- 5, older children did better), (b) mother's education; and (c) household affluence and early learning environment at home.

These findings add further evidence to the body of knowledge from around the world on the positive impact of preschool education on children's learning in the early grades. Further, our findings validate the crucial importance of the construct of school readiness, as defined in terms of acquisition of foundational competencies especially in cognitive and language domains, which serve as mediating factors in determining the magnitude of impact of preschool education on later learning. Some of the competencies that were assessed and identified include seriation, sequential thinking, pattern making, classification, number concept/conservation and phonemic awareness. Our data also indicates that school readiness levels can be enhanced through a cognitively-oriented, activity based preschool curriculum offered to children between ages 4 and 5 years which provides opportunities to acquire the above competencies through play based methods.

On the other hand, there was a negative association between attainment of school readiness levels at age 5+ with formal teaching of the 3R's at the preschool stage, which unfortunately is common practice across preschools and is also the expectation of parents. This inverse relationship can be explained by the fact that children are not yet in maturational terms 'school ready' as defined above in terms of concepts and skills that are prerequisites for the primary curriculum. This also endorses the policy directive in the National Policy on Education (NPE 1986), which categorically states *"there shall be no formal teaching of the 3R's at the preschool stage"*. Unfortunately, this practice involving rote learning is seen to be the norm, not the exception, across preschool programmes in the country, particularly in the private sector.

Further, our analysis of the school readiness data confirms its significant association with later learning in mathematics and language domains.

C. Preschool quality – existing perceptions and emerging priorities

This study conducted a comprehensive quality assessment of three models of programmes available in India for preschool education attended by 3- to 6-year-old children. These included Anganwadis, private preschools, and a few 'known practice' preschools run by an NGO. The known practices, which are very few in number, were included to ensure variance in data to enable us to assess the impact of quality. The observation based quality assessment included the following domains: physical infrastructure and access to play and learning materials, classroom composition, organization and management, pupil-teacher ratio, curriculum content and processes, and teacher characteristics and disposition.

While the detailed assessment is discussed in a previous chapter, some major findings are presented and discussed here.

9. From 'multi-tasked Anganwadis' to 'demand driven' private preschools, the quality of preschool education is not developmentally appropriate for children. 'Known practices' are innovative and developmentally appropriate only in some cases.

From the lens of a developmentally appropriate programme, neither Anganwadis nor private preschools offer an age and developmentally appropriate curriculum, although there are differences across states. Anganwadis offer preschool education as one of six services by a single semi–trained, multi tasked worker and her helper, for an expected duration of three to four hours each day. The attention to preschool education is thus by design minimal in the programme and this is reflected in the curriculum of some songs and rhymes and, at best, a game. With competition from private preschools that are attracting children away from Anganwadis, the Anganwadi workers often resort to formal teaching of the 3R's to keep parents satisfied.

The private preschools covered in this study are rural primary/secondary schools with pre-primary sections attached to them. While these have better infrastructure, the teachers are in most cases local, untrained youth who keep children occupied by focusing their curriculum entirely on rote and repetitive teaching of the 3R's, irrespective of the age or grade the child is in. While government teachers and Anganwadi workers are advised not to indulge in corporal punishment, based on the RTE Act, this was observed to be the main mode of disciplining children in private preschools. Play opportunities, both indoor and outdoor, which are critical for children's learning and development, were found largely missing from both programmes. These two programme models are the main options available at scale in India today for children below six years of age, but are largely developmentally inappropriate or inadequate.

Of the three known practices included in our sample, while all had some interesting elements, only one could be identified overall as a good practice. This programme offers a good model of a preschool programme, affordable for marginalized communities, with a more balanced, developmentally appropriate curriculum. Its curriculum and teacher support systems have several positive elements in them, discussed in more detail in Chapter 5. Although a detailed analysis of programme costs was not undertaken for any of the preschool models covered in this study, this evidence suggests that the challenge in preschool education is not so much of cost as of understanding what 'quality' means for young children and using methods and materials appropriate for this age group.

Emerging Priorities: Some important lessons emerged from our analysis of quality parameters, which indicate priorities for designing and implementing developmentally appropriate preschool education programmes. These include:

(a) Availability and use of learning and play materials

(b) Focus on classroom management and organization

(c) An interactive, democratic classroom environment with an adequately educated and trained teacher

(d) Adequate physical facilities, which emerge as an important though not sufficient condition for ensuring quality of a preschool education programme.

(e) No formal teaching of the 3R's at the preschool stage, since it has a negative relationship with developmentally appropriate activities.

The overall analysis points to the value of an integrated, thematic and activity-based approach to designing and implementing preschool education curriculum. This learning emerges from the close interdependence and association found between and among activities for different developmental domains pointing to the need to plan in terms of defined activities which cater to different domains, rather than for each domain separately.

D. Concept and significance of school readiness validated

By establishing that participation in a developmentally appropriate preschool education programme for one year between the ages of 4 and 5 years can lead to enhanced school readiness in children, these findings clearly validate the concept of school readiness and the related conceptual framework that guided the design of the study. This in turn can positively influence the levels of learning of these children in primary grades, at least till the age of eight years. The findings also indicate that the effects of preschool participation will be stronger and more sustained if the quality of preschool education is developmentally appropriate and, it can be inferred, if it is supported by a good quality early primary education programme, based on similar developmental principles in upward continuity, along the early learning continuum.

The concept of school readiness, as assessed in this study, is defined not in terms of downward extension of learning of alphabets and numbers (as is commonly believed), but instead scaffolding children's learning in the preschool years through play based activities and interactions that help them develop a conceptual, language and psychosocial foundation for later learning. These experiences would include planned activities for nurturing cognitive skills such as classification, sequential thinking, pattern making, phonemic awareness and concepts related to pre-number and number conservation. Development of vocabulary and verbal expression, communication and socialization skills, self-help skills and self-regulation or executive functions also fall within the scope and priorities for school readiness.

E. Defining quality in preschool and early primary education

The study enables us to unpack the composition of what constitutes 'developmentally appropriate quality' in preschool education that would promote school readiness. The key quality factors that emerge as significant in this context are related to attributes of the teacher, curriculum planning, content and transaction, and the physical setting of the programme. In particular, our analysis indicates that high quality preschool education programmes have teachers who are democratic in their approach, interact willingly with children and encourage interaction among them, promote curiosity and experimentation by encouraging and responding to children's questions and maintain regular communication with children as they work to help them extend their own thoughts and ideas further.

High quality ECE programmes also ensure age and developmental appropriateness of activities, flexible classroom arrangements to allow for a balance of individual and group play based activities, regular weekly and daily planning by teachers and opportunities for children to engage in a balance of language, cognitive, concept based, social and creative activities to help them develop a conceptual and language foundation for later learning of reading, writing and mathematics, rather than focus on formal teaching of the 3R's at this early stage.

The key challenge is –how to reach every Indian child at the right age with a good quality preschool education programme that would enable the child to be school ready, as is her right. This applies particularly to children who are first generation learners and are not from homes that are able to provide a stimulating early learning, print rich environment.

We present below our recommendations for what needs to be done to meet the above objectives, based on a brief synthesis of our findings and their implications for potential challenges.

8.2 Recommendations

I. Strengthening policies and planning

Recommendation 1: Include preschool education as part of the RTE Act (2009).

Preschool education should be included as an integral part of the Right to Education Act (2009), in view of its critical importance in influencing outcomes at the primary stage of education.

Our research clearly endorses the critical significance of preschool participation, at least from age 4, in a good quality preschool programme as a key input for primary education. It also provides robust evidence of the significant association between good quality preschool education and school readiness levels, and demonstrates its direct link with learning levels in early primary grades. By implication, this also points to the need to acknowledge a direct association between low learning levels at the primary stage which are currently posing a serious crisis in education in the country and the lack of access to a well conceptualized preschool education programme for children, particularly from disadvantaged communities.

Recommendation 2: Enforce the RTE Act (2009) stipulation requiring the entry age for Grade 1 to be 6+ years

All states may be encouraged by the government to fix the age for entry to Grade 1 in primary school at age 6+ to align with the RTE Act (2009) and in consonance with child development priorities, rather than 5 years as is currently the policy in 23 out of 29 states.

Our data reveals that age is a significant factor in school readiness. Older children assessed on school readiness responded better to the SRI than younger children. These findings support the need for age appropriateness in the curriculum and for the entry age for Grade 1 to be fixed at 6+ years.

Recommendation 3: Introduce preschool sections in primary schools.

Given the potential benefits of physical proximity and upward continuity of the curriculum from the perspectives of management, curriculum implementation and school readiness, the preschool stage, at least from 4 to 6 years, should be incorporated into all primary schools as the pre-primary section.

This is already a recommendation in Section 11 of the RTE Act and requires implementation by all states. A few states have already taken an initiative in this regard. Since in most states 5-year-olds are already in primary schools, this would require addition of just one grade. Parental feedback also indicates a preference for composite schools with preschools attached, as opposed to independent preschools. The cost effectiveness of this model vis-à-vis the stand-alone preschool model should be undertaken to analyse which model best meets children's needs.

Recommendation 4: Consider Early Childhood Care and Education as a stage up to 8 years, as is now globally accepted, and design a flexible, foundational curriculum for 3- to 8-year-olds from pre-primary to early primary grades.

The curriculum for this foundational stage for pre-primary and Grades 1 and 2, for children from 3 to 8 years of age, may be designed in upward continuity along the early learning continuum. It should focus on development of school readiness and early learning competencies through play and activity based pedagogical methods, with provision for children to learn at their own pace and consolidate their basic foundation.

Current preschool programmes reflect a downward extension of the primary school curriculum and formal teaching methods, instead of the upward linkage suggested here. Some key learnings from the study which provide the rationale for this recommendation are as follows: (a) children do not follow an age-wise linear pathway in pre primary and primary stages as prescribed; (b) many cognitive competencies linked to school readiness which are prerequisites for the primary curriculum, such as phonemic awareness or sequential thinking, are often not mastered by children even till the age of 7 or 8 years, suggesting the need to move away from a rigid grade-centric approach to a flexible curricular approach which allows for individual pacing; (c) the influence of preschool participation and school readiness is much better sustained if there is upward continuity in the curriculum and a good quality curriculum is

ensured in the transition years. Taken together, these findings point to the need for an upwardly graded, progressive curriculum for this foundational stage of education that will ensure that children get a sound head start for later learning. In this context, it may be useful to also conduct a review of the existing state curricula that have been developed in alignment with the National Curriculum Framework (2013) to ensure they are consistent with the indicators of quality emerging from this study.

Recommendation 5: Promote local and state initiatives and innovations for this foundational stage.

With states reflecting their own specificities and differences, innovations may be supported and promoted within centrally designed schemes for local and state level adaptations. While these may be required to adhere to the broader national framework for the scheme, space may be allowed for a more contextualized and need based approach with provisions for external evaluation of programme effectiveness.

The currently implemented ICDS programme is conceptualized as a 'one size fits all' design for reaching out to the young child. This study clearly indicates the benefits of allowing variations within a model to address contextual diversity. For example, the *Ka-shreni* initiative of Assam, included in our sample as a known practice, provides an interesting model for provision of early education for children, with potential benefits, although it was only partially implemented by the state. The model involved relocation of all early education within common school premises, including the Anganwadi for children up to 5 years and a new pre-primary class attached to primary schools for 5- to 6-year-olds as a preparatory stage in the school system. Diverse models such as these could be encouraged and evaluated to assess their relative effectiveness.

II. Ensuring quality in preschool and early primary education

Recommendation 6: Shift focus from access to quality enhancement in preschool and early primary education.

India is now well placed to invest in the quality of early childhood education with evidence of near-universal availability of preschool education, programmes although this should be accompanied with a continued focus on inclusion of the yet unreached and children with special needs.

The priority on the part of the government and all stakeholders should be to reach out to special focus groups in terms of access and simultaneously focus attention on improving the quality of preschool education around the country. Some emerging recommendations for quality assurance and enhancement are discussed below.

Recommendation 7: Institute a regulatory system for early education.

There is an urgent need to institute an effective quality regulation or accreditation system for early childhood care and education, which includes preschool education, to ensure that quality standards and prerequisites for developmentally appropriate practices are met across all sectors.

This recommendation for regulation is already a part of the National ECCE Policy (2013) and it needs to be taken forward. Quality Standards for ECCE brought out as a part of the National Curriculum Framework for ECCE (2013) could provide a useful reference in this regard.

Recommendation 8: Acknowledge and address professional needs and status of preschool teachers/educators through professional training and appropriate work expectations.

The study identifies the teacher or educator as one of the significant factors influencing quality of the preschool education programme. The need for an adequately qualified and trained teacher for the preschool stage is often overlooked. In private preschools the teachers were found to have rarely had any training in preschool education. In Anganwadis, the worker is by design a multipurpose worker with six services to handle, not always adequately educated and with at best 4 days of job training in preschool education. It is therefore strongly recommended that a dedicated preschool teacher/ educator with adequate qualifications, training and appropriate career opportunities be ensured in every preschool education programme.

Recommendation 9: Design teacher preparation programmes for the foundational stage and institute an appropriate teacher cadre in the system.

A customized teacher education curriculum for the foundational stage of education should be designed which covers to the early primary grades in an upward continuity, to meet the specific content and pedagogical requirements of this stage.

States may also be advised to institute an appropriate teacher cadre for early childhood education at par in compensation with primary teachers, to attract potentially competent young persons, given the key importance of this foundational stage.

The study indicates the significance of both academic qualifications and professional training in the making of effective teachers for this stage of education. This also requires a change of mindset among all stakeholders who believe that teaching young children does not require professional expertise. On the contrary, the early years should be considered as the most critical stage of education for laying the foundation, given that the entire educational structure rests on its shoulders.

Recommendation 10: Ensure teacher preparation strategies are supported by a system of close mentoring of teachers and of mentors themselves.

Along with design and implementation of teacher preparation programmes, a close on-site training and mentoring support system is strongly recommended. A similar arrangement for mentors may also be instituted to refresh their knowledge, skills and experience.

Strand C of our research, which studied good practices in ECCE, highlighted the combination of training with mentoring as a common feature across several good practice programmes. This was seen as key to quality maintenance and enhancement in the programme. Regular visits, demonstrations, and in-class support to teachers were seen as important features of this support.

Additionally, the research indicates the need to move away from centralized lecture-based trainings as is the current practice, to more on-site or 'near site' trainings, for both teachers and mentors for preschool and early primary grades. The priority should be to adopt methods and institutional mechanisms that enable more 'hands on' demonstration or modeling of developmentally and contextually appropriate classroom practices at the preschool and early primary stages.

III. Reaching out to all stakeholders including families and communities

Recommendation 11: Promote advocacy with all stakeholders including families and communities.

Strategies may be devised to explain to all stakeholders, including policy makers, teachers, parents and communities, why young children's learning needs are different from formal education, and why meeting these is critical to establishing the foundation for lifelong learning and development.

There is limited awareness among all stakeholders regarding what constitutes good quality early education. Most understand preschool education as a downward extension of the formal methods of primary grade learning of the 3R's, which can be counterproductive and detrimental for children. Advocacy for what constitutes good quality preschool education and its significance is required not only for parents, but for all stakeholders, including policy makers. While multi media programmes and policy briefs may be useful strategies for reaching policy makers, parents and communities may require more local and direct outreach efforts and strategies.

Recommendation 12: Promote close linkages in every preschool programme with parents, families and communities.

Every preschool and primary school may be required to organize an effective parent-school association forum which could serve to foster a smooth partnership between parents and teachers and, in the process, enable parents to (a) understand the philosophy and practice underlying good quality early education and (b) contribute their own efforts and resources to enhance and maintain the quality of the programme.

The study identifies mothers' education and the early learning environment at home as two key household factors influencing school readiness levels among children. This finding points to the urgent need to reach out to families and communities regarding the significant contribution they can make at home in meeting the early stimulation and learning needs of their young children.

Parental perceptions and expectations regarding quality in early education are also, to an extent, responsible for the rising demand for developmentally inappropriate early education. Involving parents in the preschool and school programmes and maintaining channels of communication with them could be an effective approach to not only educate them on the priorities for early education, but also engage with them on ways in which they can contribute to the quality of the programmes their children are attending.

Recommendation 13: Promote women's education and literacy programmes

Adult literacy and women's continuing education programmes need to be promoted through adult literacy campaigns or open school systems. The significance and modes of developmentally appropriate child care practices including early stimulation of children can be included in the content of these programmes.

While women's education is important in its own right, it is significant factor influencing school readiness in children. In this context, social sector programmes such as micro-credit initiatives or skills based income generation programmes launched by governments or international and voluntary agencies may incorporate this theme into their content.

Recommendation 14: Suggestions for future research

This study has contributed to the understanding of the status and key importance of early childhood education in the country, particularly in the context of the RTE Act (2009). While it has answered many of the questions posed at the inception of the study, it has also raised some questions which need to be taken up in future research. Some of these are suggested below:

(i) The study has provided encouraging evidence regarding the impact of good quality preschool education on narrowing the social equity gap, on the basis of exploratory analysis on a small sub-sample of children. These findings need further validation on a larger sample and in diverse locations.

(ii) While the study has expressed concern regarding existing preschool programmes, identified what could be indicators of a good quality preschool education/foundational programme and looked at some good practices in this context, it is important to understand the monetary and non-monetary investments required to implement some of these programmes or incorporate these indicators into existing programmes at scale in a viable manner across diverse contexts.

(iii) Given the sociocultural and language diversity in the country, it would be useful to explore alternative models for providing preschool/ foundational early education to children that incorporate contextual specificities, and assess their relative cost effectiveness. Furthermore, it would be important to look at the extent to which the extent to which they help bridge the gap in terms of school readiness of children from less privileged backgrounds vis-à-vis their peers from privileged backgrounds.

(iv) With the current policy emphasis on inclusion of children with special needs and of those from diverse socio-linguistic contexts, there is a need to examine and identify the specific school readiness needs of these groups of children at the foundational stage. Qualitative research is required in this context, to identify specific areas or domains which may require curricular adaptations for different groups and to get these adaptations trialled and piloted before they are mainstreamed.

(v) Research on teacher preparation models or strategies is required for diverse contexts, to arrive at key indicators of effective teacher education programmes which could include components of both off-site and on-site training and support and close mentoring.

(vi) Qualitative research is required to understand the nuances and specificities of diverse social contexts in which children are located in their early childhood years in India, in particular those children not coming to preschool or live in remote locations. Studying the knowledge and informal learning they bring from their familial and social contexts can feed into the design and implementation of an appropriate curriculum for the foundational early education stage.

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APPENDICES

Appendix 1

Strands B and Strand C researchers

Aakansha Kaushik, Ameesha Oberoi, Anindita Medhi, Aparajita Bhargarh Chaudhary, Apurva Mitra, Ayesha Raees, C. Arunarekha, Ch. Vijayalakshmi, Dushyant Chawla, G. Anil, G. Aravind, G. Kamala, G. Sujatha, I. Seetaramu, I. Siddhartha, Ikanshi Khanna, Insha Mohammad, Jyoti Das, K. Godalakshmi, K. Soujanya, Kaveri Urmil, Komal Khanna, Krishna Moni Saikia, M Anitha, M. Badraiah, Madhavilatha, Madhulika Jha, Manish Jain, Mayuri malli Kaishyap, Meenakshi Dogra, Mohammad Ashhad Jamal, Mohammad Yakub, Monalima D. Deka, Monica Jairam, Monu Lal Sharma, N. Padmaja, Nadeema Rahman, Namrata Sinha, Nandita Deka, Nayanakhee Sarma, Nayantara Das, Neha Gupta, Niharika Budhraja, P. Chaya Katti, P. Santosh, Parul Taneja, Poorva Chadha, Pragya Sharma, Preeti Mahalwal, Ridhi Makkar, Rohini Tripathi, Ruchi Aggrawal, S. Ashwini, Sandeep Sharma, Sangaratan, Satyanarayana, Shabana Hasin Alam, Shipra Sharma, Snehlata Jaswal, Suneha Kandpal, Surbhi Batra, Swarnali Talukdar, Swati Bawa, V. Bharat and V. Ratnamala.

Strand C lead researchers

Anjali Gokhale, Deepa Jain, Manish Jain, Monimalika Day, Nandita Chaudhary, Suman Sachdeva, Reeta Sonawat, Sunita Singh, Usha Abrol, Usha Nayyar, Venita Kaul.

Appendix 2: Description of tools and schedules used in the study

Given that one strand of the study was designed to collect a limited amount of information for a large sample while the other was intended to provide a more comprehensive, detailed understanding based on a smaller sample of children, the specific instruments and methods used for data collection were not always the same.

Household information: Both strands used the same survey questionnaire to collect detailed household information for sampled children. This information includes data on household composition; social, economic, and educational indicators; and indicators on the home learning environment.

Programme quality: The instruments used to collect information on the preschools and schools attended by sampled children were completely different across the two strands. In the larger Strand A effort, survey teams visited every preschool or school attended by sampled children, resulting in visits to as many as 14 to 20 such institutions in and around each sampled village. Surveyors administered a Rapid Facility Survey during a single visit to each institution to collect data on a few key characteristics of the facility.

In contrast, the smaller Strand B study collected extensive information on 'community preferred' preschools – those that were attended by at least 5 children from the sample age group in the village. Research teams used a rating scale – the Early Childhood Education Quality Assessment Scale (ECEQAS) to collect detailed information on the quality of preschool programmes based on their observations during one full day. ECEQAS assessed the quality of programmes that children attended in terms of the infrastructure, teacher quality and content and processes of the classrooms and centres. An extension of ECEQAS, ECEQAS Plus was used to assess the exposure of children at age 6, 7 and 8.

Learning assessments: All assessments rounds were conducted one on one by trained assessors.[58] Every assessment round contained a set of items that were common across both strands, in order to facilitate comparison of the results, as well as additional items that were specific to one or the other strand. However, the proportion of common questions as a fraction of the total number of items diminished over successive assessment rounds. This is because as the cohort of children grew older, the tools used for the smaller sample of children (Strand B) also grew in length and complexity; whereas those used for the large sample (Strand A) were deliberately kept shorter and simpler to facilitate administration on scale.[59] While the School Readiness assessment tested children on a range of cognitive, pre-literacy and pre-numeracy skills, each round of the EGA was designed to assess children's grasp over slightly more complex concepts in cognition, emergent math and language skills. Because the study followed children of a particular age, rather than from a particular grade, each of these instruments was designed to be age rather than grade appropriate.[60]

In keeping with its objective of exploring the impact of preschool experience on children, Strand B employed an additional data collection instrument to assess the behavioural aspects of school readiness with children in the smaller sample, when children were 4 and 5 years old respectively. This was the ABS, an interview-based rating scale used by researchers with the primary caregivers of sample children, to assess the behavioural aspect of school readiness and rate the children on self-help skills, communication skills, emotional regulation and social skills. Behavioural outcomes were also assessed

[58] While efforts were made to assess children only within their homes, this was not always possible due to survey timings and logistics. However, irrespective of whether these assessments were conducted within homes, preschools or schools, care was taken to limit the distractions or interferences from those around, including family members, staff/teachers or other children.

[59] Each Strand A assessment tool was adapted from the corresponding Strand B tool after extensive field piloting. Adaptations were based on potential difficulties in ensuring consistent administration and/or scoring of individual items, which may have compromised the quality of the data collected. Modifications were made to administration instructions, scoring instructions, and/or to test items themselves; in some cases, test items were dropped entirely.

[60] More information on the development and content of assessment tools is provided in Appendix, see table 7.1 and 7.2.

among the sample cohort at age 6, 7 and 8 using a rating scale called Psycho-social Assessment Scale for Primary Grades. This was done through an observation rating scale which assessed children on behavioural indicators in the classroom environment and looked at their participation level in the class along with socialisation, communication and emotional regulation skills.

Child tracking: In order to obtain more precise information on children's exposure to ECE programmes, children in both strands were tracked between the annual assessment field visits. In Strand A, one to two tracking visits were conducted each year in order to collect information on the child's participation status. In Strand B, children were observed for longer periods during the assessment rounds and tracked once annually.

Finally, in addition to the quantitative measurements described above, both strands also conducted in-depth qualitative interviews with parents of sampled children and other stakeholders at different points during project implementation. In Strand A, these interviews were conducted after all rounds of quantitative data collection had been completed and the data partially analysed. On the basis of preliminary results, 12 villages were purposively selected (2 per district) to be as different from each other as possible with respect to children's participation trajectories and learning outcomes. Parents of about 15 children in each of these villages were interviewed at length to understand the households' decision making processes with respect to their young children. In all, close to 200 interviews provide a wealth of information on parents' perceptions, with regard to their children's participation in the early years and beyond.

In the case of Strand B, the phenomenon of expansion of privatization in education was explored using a qualitative case study methodology by selecting one village in each state and studying the history of private schooling along with understanding parental perceptions with regards to the importance of education, quality of education across different providers and decision making. Community leaders, parents, teachers and head masters were interviewed to understand their perspectives.

Appendix 2.1: Profile of the study districts; along with their respective states

	Rajasthan	Ajmer	Alwar	Telangana	Medak	Warrangal	Assam	Dibrugarh	Kamrup
	Demographic profile*								
Population (in 000's)	68621	2,585	3,672	352	3,032	3,523	31169	1,328	1,517
Population 0-6 (per cent)	15.30	14.50	15.81	39.20	11.50	9.21	14.50	11.67	12.9
SC (per cent)	17.8	18.5	17.8	15.4	17.7	17.5	7.2	4.4	7.1
ST (per cent)	13.5	2.5	7.9	9.3	5.6	15.1	12.4	7.8	12
Sex ratio	926	950	894	987	989	994	954	952	946
Female literacy	52.7	56.4	56.8	57.9	52.5	56.5	67.3	69.5	67.7
Urban population (per cent)	19.3	40.1	17.8	38.7	24	28.3	11	18.4	9.4
Economic profile									
GSDP (2014-15) at constant prices**^ (INR, lakh crores)	272,227	NA	NA	217432	NA	NA	92432	NA	NA
% Growth of GDSP (at constant prices) over previous year**^	5.75	NA	NA	5.33	NA	NA	6.41	NA	NA
Per capita NSDP (2014-15) at constant prices **^ (INR)	33186	NA	NA	51017	NA	NA	23968	NA	NA
Share of agriculture in GSDP (2013-14P) at constant prices **^	18.01	NA	NA	14.81#	NA	NA	17.77	NA	NA
Share of agriculture and allied activities in GSDP (2013-14) at constant prices****^	20.27	NA	NA	19.04#	NA	NA	21.27	NA	NA
Enrolment profile of children aged 4- 6***									
Age 4									
Per cent of children aged 4 in balwadi/ AWCs	23.57	14.67	16.28	42.69	55.77	30.43	71.41	72.58	81.82
Per cent of children aged 4 in LKG/ UKG	25.11	29.33	36.05	42.49	26.92	60.87	11.94	12.9	6.82
Per cent out-of-school or preschool	51.32	56	47.67	14.81	17.31	8.7	16.65	14.52	11.36
Age 5									
Per cent of children aged 5 in balwadi/ AWCs	9.6	3.13	6.25	11.06	14.58	10	13.57	9.09	28.57
Per cent of children aged 5 in LKG/ UKG	19.85	28.13	37.5	37.25	52.08	76.67	2.83	0	4.08
Per cent of children aged 5 in school	57.35	50	44.64	48.71	33.33	13.33	78.23	84.85	67.35
Per cent out-of-school or preschool	13.2	18.75	11.61	2.99	0	0	5.37	6.06	0

	Rajasthan	Ajmer	Alwar	Telangana	Medak	Warrangal	Assam	Dibrugarh	Kamrup
	Demographic profile*								
Age 6									
Per cent of children aged 6 in balwadi/ AWCs	2.82	4.55	0	1.36	3.77	0	4.25	3.51	25
Per cent of children aged 6 in LKG/ UKG	11.16	20.45	16.47	19.68	24.53	36.36	2.09	1.75	2.27
Per cent of children aged 6 in school	81.04	69.32	78.82	76.54	67.92	63.64	92.01	91.23	70.45
Per cent out-of-school or preschool	4.98	5.68	4.71	2.42	3.77	0	1.65	3.51	2.27
Learning level profile***									
Grade 1									
Per cent of children in Grade 1 who can read Std.1 text or beyond	6.4	10	11.8	4.7	5.2	2	8	5.3	6.7
Per cent of children in Grade 1 who can recognize two digit numbers or beyond	14.5	13.3	22.4	53.8	48.3	56.9	23	17.9	28
Grade 2									
Per cent of children in Grade 2 who can read Std.2 text	9.8	19.8	10.3	4.5	2.6	3.9	8.6	15.9	22.2
Per cent of children in Grade 2 who can do subtraction or beyond	9.2	7.5	20.6	15.5	21.1	23.5	14.1	11.6	33.3
Grade 3									
Per cent of children in Grade 3 who can read Std. 2 text	23.6	39.1	30.5	18.6	14.3	9.7	17.2	20.8	32.4
Per cent of children in Grade 3 who can do division	6.9	8.7	13.6	4.7	2.4	3.2	3	2.1	2.7

Sources: * Census 2011 as cited in DISE,
** NITI Aayog, *** ASER (2016) , ****Planning commision website
^ Price deflator 2004-2005
# Data available for Andhra Pradesh

Appendix 4.1: % Children by different participation trajectories in three academic years

State	N	Partial participation	Full Participation					Total
			Three years of preschool	Two years of preschool followed by one year of school	One year of preschool followed by two years of school	Other mixed	Three years of primary school	
Assam	2,126	6.7	46.6	30.4	0.0	16.3	0.0	100
Rajasthan	3,003	24.7	12.5	12.6	18.6	20.8	10.9	100
Telangana	2,111	6.8	14.2	16.1	23.5	34.3	5.3	100
All Children	7,240	14.2	23.0	18.8	14.6	23.4	6.1	100

Appendix 4.2: % Children by different participation trajectories in four academic years

State	N	Partial participation	Full Participation (in academic-years):						Total
			Four years of preschool	Three years of preschool followed by one year of school	Two years preschool followed by two years of school	One year preschool followed by three years of school	Other mixed	Four years of primary school	
Assam	2126	8.3	12.9	27.5	29.5	0.0	21.8	0.0	100
Rajasthan	3003	25.5	3.2	8.4	12.1	18.0	22.3	10.6	100
Telangana	2111	6.8	2.1	11.1	15.5	23.1	36.3	5.1	100
All Children	7240	15.0	5.7	14.8	18.2	14.2	26.3	5.9	100

Appendix 4.3: % Children by different participation trajectories in five academic years

State	N	Partial partici-pation	Five years of preschool	Four years of preschool followed by one year of school	Three years of preschool followed by two years of school	Two years preschool followed by three years of school	One year preschool followed by four years of school	Other mixed	Five years of primary school	Total
Assam	2126	8.9	2.5	10.1	27.4	29.3	0.0	21.8	0.0	100
Rajasthan	3003	26.1	0.6	2.3	8.2	11.9	17.8	22.6	10.4	100
Telangana	2111	6.9	0.1	1.8	11.1	15.3	23.0	36.8	5.1	100
All Children	7240	15.4	1.1	4.5	14.7	18.0	14.1	26.5	5.8	100

Appendix 4.4: Distribution of households asset index (all children)

State	N	Low	Medium	High	Total
Assam	1947	10.3	59.2	30.5	100
Rajasthan	2928	19.5	43.6	36.9	100
Telangana	1828	53.7	28.9	17.4	100
Total	6703	26.2	44.1	29.7	100

Appendix 4.5: Distribution of children based on mother's education level (all children)

State	N	No education	Up to primary education	Above primary education	Total
Assam	1882	47.1	16.8	36.1	100
Rajasthan	2860	58.0	14.9	27.1	100
Telangana	1741	32.7	19.6	47.7	100
Total	6483	48.0	16.7	35.3	100

Appendix 5.1 : Description of Early Childhood Education Quality Assessment Scale (ECEQAS)

S. No.	Concept	Score
A	**Infrastructure – Facilities in school**	
1	Toilet availability & use	
2	Availability of water in toilet	
3	Availability of clean water for drinking	
B	**Infrastructure – Physical setting of school**	
4	No hazardous conditions around the centre	
5	Clean surroundings around centre	
6	Safety level of building that is maintained	
7	Quality of infrastructure facilities for children with special needs	
8	No noise pollution	
C.	**Physical infrastructure of the school**	
9	Availability of classroom space for children to sit comfortably	
10	Proper storage for teacher to keep material	
11	Appropriate sitting facility for children	
12	Clean classroom & sitting arrangement	
D.	**Learning/Play Aids**	
13	Availability of space and equipment for outdoor play/ activities for all children	
14	Availability of varieties of equipment/ materials for indoor learning/play activities	
15	Use of indoor learning materials in the class	
E.	**Classroom Management**	
16	Flexible seating arrangements according to activities	
17	Arrangement of the class according to activities	
18	Display of material at children's level of understanding	
19	Display of material produced by child	
20	Teacher supervision of class	
21	Age-wise composition of children in class	
F.	**Classroom Planning**	
22	Teacher-child ratio less than 1:25 in class	
23	Age appropriateness of activities ensured by teacher	
24	Weekly/Daily schedule followed by teacher	
G.	**Personal Care, Hygiene and Habit Formation**	
25	Habit of washing hands by children	
26	Regular checking of personal grooming of children	
27	Independent toileting by children	
28	Children's are able to eat independently	
H.	**Language and Reasoning Experiences**	
29	Most children understand language of teacher	
30	Listening opportunities provided by teacher	
31	Speaking opportunities provided by teacher	
32	Use of language to extend children's thinking & express themselves	
33	Activities & material for language development	

S. No.	Concept	Score
	Activities for cognitive development	
34	Activities & materials for concepts formation	
35	Activities & materials for developing cognitive skills	
36	Activities for development of reading, writing & number readiness	
37	Does not conduct activities for reading, writing & number	
I.	**Fine and Gross Motor Activities**	
38	Teacher ensuring children's participation in outdoor activities	
39	Conduct activities for gross motor development	
40	Opportunity for free & guided activities under supervision	
41	Conduct activities for fine motor development & ensuring participation	
J	**Creative Activities**	
42	Opportunity for all children in creative activities	
43	Opportunity for the children to recite rhymes & songs	
44	Providing opportunity & ensuring children's participation in singing	
45	Opportunity provided for children to participate in activities involving music & movement	
46	Opportunity for children to participate in both individual & group recitation	
47	All children's performance & participate in recitation & singing	
48	Classroom arrangement & time provided by teacher for free play	
49	Teacher provides opportunities for free play & interact with children during play	
K	**Social Development**	
50	Comfort level of children with strangers	
51	Teacher greets every child on arrival & departure	
52	All children greet the teacher on arrivals & departure	
53	Planning activities to ensure learning of cooperation & sharing	
54	Liberal classroom environment for the children to interact with peers & teachers	
55	Ensuring teacher-child interaction	
56	Interaction between girls & boys during play time	
57	Interaction between peers & with their teachers during meal/snack time	
L	**Teacher's disposition**	
58	Encouragement of social interaction among children during free play	
59	Teacher encourages self expression in arts & craft activities & appreciation with guidance	
60	No bias displayed by teacher towards gender	
61	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	
62	Inclusion of children with special needs during play	
63	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	

Appendix 5.2: Description of Early Childhood Education Quality Assessment Scale Plus (ECEQAS Plus)

S. No.	Concept	Score
A	**Physical setting of the school**	
1	Toilet availability & use	
2	Availability of water in toilet	
3	Availability of clean water for drinking	
4	No hazardous conditions around the school	
5	Clean surroundings around school	
6	Safety level of building that is maintained	
7	Quality of infrastructure facilities for children with special needs	
8	No noise Pollution	
9	Availability of medical aid	
B	**Physical infrastructure of the school**	
10	Class conducted in appropriate space	
11	Availability of classroom space for children to sit comfortably	
12	Appropriate sitting facility for children	
13	Availability of space for out door play	
14	Appropriate facility available for children to keep their belonging	
15	Proper storage for teacher to keep material	
C	**Outdoor play**	
16	Availability and use of outdoor equipment	
D	**Learning and play material**	
17	Availability and appropriateness of activity based learning material	
18	Appropriate learning materials for children with special needs	
19	Availability of blackboard & chalk for teacher	
20	Availability of workbooks/activity books for children	
21	Availability of class library and its use	
22	Use of activity based learning materials	
23	Teacher's use of textbook	
E	**Classroom Arrangement**	
24	Flexible seating arrangements	
25	Inclusive seating arrangement	
26	Print rich environment	
27	Arrangement of the class according to activities	
28	Display of material produced by children	
29	Display of material	
30	Regular & relevant display of material	
F	**Classroom Planning**	
31	Teacher assigned to the class	
32	Individual planning for children	
33	Level/age appropriate activities	
34	Age/development appropriateness of activities ensured by teacher	
35	Weekly/Daily schedule followed by teacher	
36	Teacher supervision of class	

S. No.	Concept	Score
G	**Classroom Management**	
37	Teacher-child ratio less than 1:30 in class	
38	Age-wise composition of children in class	
39	Class composition	
40	Addressing multi-grade classrooms	
41	Cooperative learning encouraged by the teacher	
H	**Personal Hygeine**	
42	Habit of washing hands by children	
43	No toileting accidents	
44	Regular checking of personal grooming of children	
45	Children come well groomed	
46	Keeping the classroom clean	
47	Planned meal time	
I	**Teaching Process**	
48	Teacher introduces a new lesson/concept/activity innovatively	
49	Participation level of children	
50	Encouraging Children's questions	
51	Asking children questions	
52	Promoting Higher order thinking	
J	**Activity for language development**	
53	Most children understand language of teacher	
54	Using bilingualism/multilingualism as a resource	
55	Listening opportunities provided by teacher	
56	Speaking opportunities provided by teacher	
57	Opportunities and activities for reading readiness	
58	Opportunities and activities for reading	
59	Opportunities and activities for writing readiness	
60	Opportunities and activities for learning writing	
K	**Environmental understanding**	
61	Activities & materials for concept formation related to environment	
L	**Activity for maths**	
62	Activities for number readiness	
63	Activities & materials for developing cognitive skills	
64	Activities for learning maths concept	
M	**Development of Creativity**	
65	Classroom arrangement & time provided by teacher for free play	
66	Opportunity for all children in creative activities	
67	Opportunity for children to participate in both individual & group creative activities	
68	Opportunity for divergent thinking	
69	Teacher provides opportunities for free choice play & interact with children during play	

S. No.	Concept	Score
N	**Assessment and Monitoring**	
70	Monitoring children's activity/learning	
71	Response to learning difficulties	
72	Nature of Homework	
73	Load of home work	
74	Feedback to children	
O	**Activity for social development**	
75	Teacher greets children on arrival & departure	
76	All children greet the teacher on arrivals & departure	
77	Ensuring teacher-child interaction	
78	Liberal classroom environment for the children to interact with peers & teachers	
79	Planning activities to ensure learning of cooperation & sharing	
80	Interaction between peers & with their teachers during meal/snack time	
81	Comfort level of children with strangers	
P	**Teacher's Personality**	
82	Quality of teacher's voice	
83	Teacher has child friendly disposition/behaviour	
Q	**Teacher Approach Learning Process**	
84	Teacher's response to children' errors	
85	Teacher responsive to the needs & problems of childrene	
86	Teacher encourages self expression in arts & craft activities & appreciation with guidanc	
87	Disciplining of children	
88	Teacher uses positive guidance as incentive for good performance	
89	No use of corporal punishment	
R	**Teacher Senstivity**	
90	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	
91	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	
92	Inclusion of children with special needs during play	
93	No bias displayed by teacher towards gender	
94	Teacher makes efforts to break gender stereotypes	

Appendix 5.3: Percentage of preschool programmes with maximum score (signifying best conditions on the particular indicator) on different quality indicator (as assessed by ECEQAS Plus) across types of programmes and states

S. No.	Domains and Indicators assessed	RAJASTHAN			ASSAM		TELANGANA	
		Anganwadi Centre	Private School	Known Practice	Anganwadi Centre	Private School	Anganwadi Centre	Private School
	Sample (N)	10	33	9	101	10	54	54
A	**Infrastructure – Facilities in school**							
1	Toilet availability & use	10.00%	57.58%	33.33%	3.96%	80.00%	3.70%	66.67%
2	Availability of water in toilet	10.00%	24.24%	22.22%	1.98%	50.00%	1.85%	48.15%
3	Availability of clean water for drinking	80.00%	63.64%	44.44%	48.51%	90.00%	72.22%	92.59%
B	**Infrastructure – Physical setting of school**							
4	No hazardous conditions around the centre	10.00%	24.24%	33.33%	30.69%	90.00%	27.78%	70.37%
5	Clean surroundings around centre	20.00%	27.27%	44.44%	41.58%	80.00%	24.07%	66.67%
6	Safety level of building that is maintained	60.00%	30.30%	77.78%	42.57%	70.00%	51.85%	88.89%
7	Quality of infrastructure facilities for children with special needs	10.00%	0.00%	0.00%	2.97%	0.00%	3.70%	1.85%
8	No noise pollution	70.00%	63.64%	88.89%	72.28%	60.00%	72.22%	88.89%
C.	**Physical infrastructure of the school**							
9	Availability of classroom space for children to sit comfortably	60.00%	24.24%	88.89%	45.54%	40.00%	57.41%	44.44%
10	Proper storage for teacher to keep material	60.00%	27.27%	77.78%	6.93%	60.00%	42.59%	50.00%
11	Appropriate sitting facility for children	40.00%	33.33%	88.89%	53.47%	100.00%	46.30%	81.48%
12	Clean classroom & sitting arrangement	40.00%	39.39%	100.00%	49.50%	80.00%	64.81%	90.74%
D.	**Learning/Play Aids**							
13	Availability of space and equipment for outdoor play/ activities for all children	10.00%	0.00%	0.00%	1.98%	10.00%	5.56%	14.81%

S. No.	Domains and Indicators assessed	RAJASTHAN			ASSAM		TELANGANA	
		Anganwadi Centre	Private School	Known Practice	Anganwadi Centre	Private School	Anganwadi Centre	Private School
	Sample (N)	**10**	**33**	**9**	**101**	**10**	**54**	**54**
14	Availability of varieties of equipment/ materials for indoor learning/play activities	10.00%	0.00%	55.56%	10.89%	20.00%	9.26%	3.70%
15	Use of indoor learning materials in the class	10.00%	0.00%	88.89%	31.68%	20.00%	12.96%	3.70%
E.	**Classroom Management**							
16	Flexible seating arrangements according to activities	10.00%	3.03%	88.89%	15.84%	0.00%	50.00%	31.48%
17	Arrangement of the class according to activities	0.00%	0.00%	33.33%	0.00%	0.00%	25.93%	12.96%
18	Display of material at children's level of understanding	10.00%	30.30%	66.67%	0.00%	70.00%	50.00%	72.22%
19	Display of material produced by child	10.00%	9.09%	77.78%	7.92%	60.00%	24.07%	61.11%
20	Teacher supervision of class	30.00%	3.03%	22.22%	14.85%	10.00%	33.33%	18.52%
21	Age-wise composition of children in class	0.00%	0.00%	22.22%	1.98%	10.00%	3.70%	0.00%
F.	**Classroom Planning**							
22	Teacher-child ratio less than 1:25 in class	70.00%	90.91%	100.00%	89.11%	100.00%	98.15%	98.15%
23	Age appropriateness of activities ensured by teacher	0.00%	9.09%	33.33%	3.96%	40.00%	9.26%	64.81%
24	Weekly/Daily schedule followed by teacher	70.00%	15.15%	66.67%	14.85%	20.00%	79.63%	11.11%
G.	**Personal Care, Hygiene and Habit Formation**							
25	Habit of washing hands by children	10.00%	15.15%	11.11%	2.97%	40.00%	9.26%	24.07%
26	Regular checking of personal grooming of children	10.00%	30.30%	44.44%	8.91%	30.00%	38.89%	25.93%
27	Independent toileting by children	70.00%	87.88%	88.89%	77.23%	80.00%	85.19%	75.93%
28	Children's are able to eat independently	100.00%	60.61%	11.11%	37.62%	80.00%	83.33%	77.78%

S. No.	Domains and Indicators assessed	RAJASTHAN			ASSAM		TELANGANA	
		Anganwadi Centre	Private School	Known Practice	Anganwadi Centre	Private School	Anganwadi Centre	Private School
	Sample (N)	10	33	9	101	10	54	54
H.	**Language and Reasoning Experiences**							
29	Most children understand language of teacher	90.00%	93.94%	100.00%	86.14%	70.00%	85.19%	83.33%
30	Listening opportunities provided by teacher	40.00%	15.15%	100.00%	15.84%	30.00%	31.48%	18.52%
31	Speaking opportunities provided by teacher	50.00%	6.06%	88.89%	38.61%	50.00%	51.85%	22.22%
32	Use of language to extend children's thinking & express themselves	60.00%	15.15%	77.78%	31.68%	50.00%	51.85%	27.78%
33	Activities & material for language development	0.00%	24.24%	88.89%	28.71%	40.00%	44.44%	29.63%
	Activities for cognitive development							
34	Activities & materials for concepts formation	0.00%	0.00%	55.56%	10.89%	30.00%	11.11%	0.00%
35	Activities & materials for developing cognitive skills	0.00%	0.00%	66.67%	4.95%	10.00%	16.67%	0.00%
36	Activities for development of reading, writing & number readiness	0.00%	12.12%	55.56%	13.86%	30.00%	27.78%	44.44%
37	Does not conduct activities for reading, writing & number	20.00%	0.00%	44.44%	3.96%	0.00%	18.52%	7.41%
I.	**Fine and Gross Motor Activities**							
38	Teacher ensuring children's participation in outdoor activities	30.00%	12.12%	33.33%	12.87%	10.00%	14.81%	22.22%
39	Conduct activities for gross motor development	0.00%	3.03%	44.44%	18.81%	0.00%	9.26%	11.11%
40	Opportunity for free & guided activities under supervision	10.00%	3.03%	66.67%	3.96%	0.00%	11.11%	18.52%
41	Conduct activities for fine motor development & ensuring participation	10.00%	0.00%	100.00%	15.84%	10.00%	0.00%	1.85%

S. No.	Domains and Indicators assessed	RAJASTHAN			ASSAM		TELANGANA	
		Anganwadi Centre	Private School	Known Practice	Anganwadi Centre	Private School	Anganwadi Centre	Private School
	Sample (N)	10	33	9	101	10	54	54
J	**Creative Activities**							
42	Opportunity for all children in creative activities	10.00%	6.06%	100.00%	18.81%	20.00%	5.56%	9.26%
43	Opportunity for the children to recite rhymes & songs	40.00%	24.24%	77.78%	43.56%	20.00%	31.48%	31.48%
44	Providing opportunity & ensuring children's participation in singing	20.00%	30.30%	77.78%	48.51%	60.00%	40.74%	35.19%
45	Opportunity provided for children to participate in activities involving music & movement	20.00%	15.15%	88.89%	37.62%	50.00%	37.04%	35.19%
46	Opportunity for children to participate in both individual & group recitation	30.00%	27.27%	55.56%	20.79%	70.00%	31.48%	37.04%
47	All children's performance & participate in recitation & singing	20.00%	12.12%	66.67%	30.69%	20.00%	25.93%	24.07%
48	Classroom arrangement & time provided by teacher for free play	10.00%	0.00%	22.22%	1.98%	0.00%	22.22%	12.96%
49	Teacher provides opportunities for free play & interact with children during play	20.00%	0.00%	77.78%	6.93%	10.00%	12.96%	9.26%
K	**Social Development**							
50	Comfort level of children with strangers	10.00%	39.39%	55.56%	37.62%	90.00%	51.85%	50.00%
51	Teacher greets every child on arrival & departure	0.00%	12.12%	11.11%	10.89%	60.00%	42.59%	83.33%
52	All children greet the teacher on arrivals & departure	0.00%	33.33%	11.11%	10.89%	60.00%	40.74%	79.63%
53	Planning activities to ensure learning of cooperation & sharing	10.00%	0.00%	33.33%	8.91%	0.00%	35.19%	25.93%
54	Liberal classroom environment for the children to interact with peers & teachers	50.00%	12.12%	77.78%	47.52%	10.00%	61.11%	33.33%

S. No.	Domains and Indicators assessed	RAJASTHAN			ASSAM		TELANGANA	
		Anganwadi Centre	Private School	Known Practice	Anganwadi Centre	Private School	Anganwadi Centre	Private School
	Sample (N)	**10**	**33**	**9**	**101**	**10**	**54**	**54**
55	Ensuring teacher-child interaction	50.00%	3.03%	77.78%	35.64%	40.00%	53.70%	48.15%
56	Interaction between girls & boys during play time	70.00%	39.39%	100.00%	40.59%	40.00%	59.26%	42.59%
57	Interaction between peers & with their teachers during meal/snack time	50.00%	9.09%	11.11%	32.67%	60.00%	62.96%	46.30%
L	**Teacher's disposition**							
58	Encouragement of social interaction among children during free play	50.00%	6.06%	77.78%	36.63%	30.00%	53.70%	42.59%
59	Teacher encourages self expression in arts & craft activities & appreciation with guidance	10.00%	6.06%	66.67%	20.79%	20.00%	9.26%	7.41%
60	No bias displayed by teacher towards gender	50.00%	66.67%	100.00%	90.10%	90.00%	46.30%	37.04%
61	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	children with special needs were not present in the class						
62	Inclusion of children with special needs during play							
63	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	80.00%	81.82%	100.00%	97.03%	100.00%	100.00%	98.15%

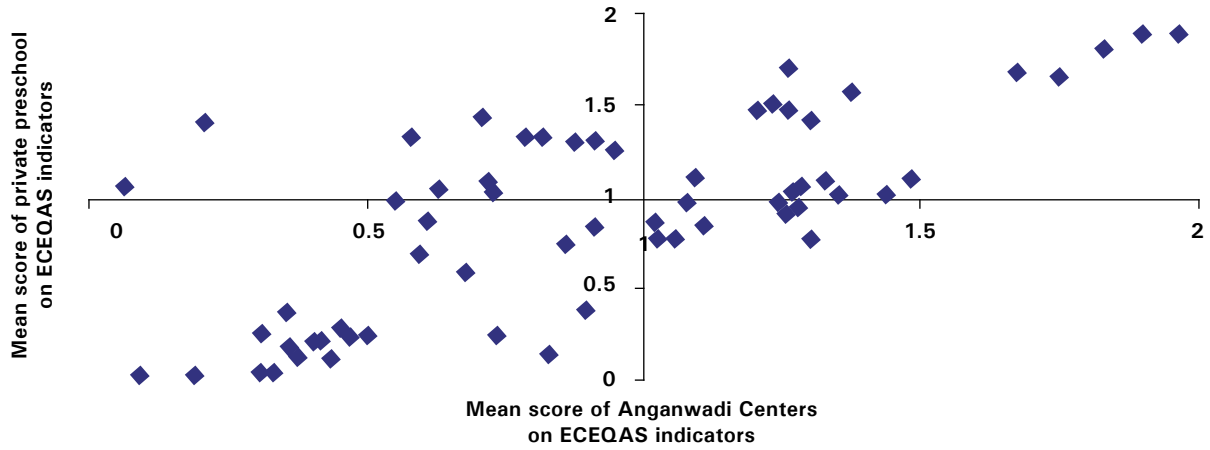
Appendix 5.4: Means scores of Anganwadi centres and Private Preschools on ECEQAS quality indicators

S. No.	Indicator of ECEQAS	Anganwadi Centre	Private Preschool
1	Toilet availability & use	0.2	1.4
2	Availability of water in toilet	0.1	1.1
3	Availability of clean water for drinking	1.3	1.7
4	No hazardous conditions around the centre	0.8	1.4
5	Clean surroundings around centre	0.9	1.3
6	Safety level of building that is maintained	1.2	1.5
7	Quality of infrastructure facilities for children with special needs	0.1	0.1
8	No noise pollution	1.7	1.7
9	Availability of classroom space for children to sit comfortably	1.3	1.1
10	Proper storage for teacher to keep material	0.7	1.1
11	Appropriate sitting facility for children	1.3	1.5
12	Clean classroom & sitting arrangement	1.4	1.6
13	Availability of space and equipment for outdoor play/ activities for all children	0.6	0.7
14	Availability of varieties of equipment/ materials for indoor learning/play activities	0.7	0.3
15	Use of indoor learning materials in the class	0.8	0.2
16	Flexible seating arrangements according to activities	1.1	0.9
17	Arrangement of the class according to activities	0.4	0.2
18	Display of material at children's level of understanding	0.6	1.4
19	Display of material produced by child	0.6	1.1
20	Teacher supervision of class	0.9	0.4
21	Age-wise composition of children in class	0.2	0.1
22	Teacher-child ratio less than 1:25 in class	1.9	1.9
23	Age appropriateness of activities ensured by teacher	0.9	1.3
24	Weekly/Daily schedule followed by teacher	1.3	0.8
25	Habit of washing hands by children	0.6	1.0
26	Regular checking of personal grooming of children	0.7	1.0
27	Independent toileting by children	1.7	1.7
28	Children's are able to eat independently	1.2	1.5
29	Most children understand language of teacher	1.8	1.8
30	Listening opportunities provided by teacher	0.9	0.9
31	Speaking opportunities provided by teacher	1.4	1.0
32	Use of language to extend children's thinking & express themselves	1.3	1.1
33	Activities & material for language development	0.9	0.8
34	Activities & materials for concepts formation	0.4	0.2
35	Activities & materials for developing cognitive skills	0.3	0.1
36	Activities for development of reading, writing & number readiness	0.6	0.9

S. No.	Indicator of ECEQAS	Anganwadi Centre	Private Preschool
37	Does not conduct activities for reading, writing & number	0.4	0.2
38	Teacher ensuring children's participation in outdoor activities	0.4	0.4
39	Conduct activities for gross motor development	0.5	0.3
40	Opportunity for free & guided activities under supervision	0.3	0.3
41	Conduct activities for fine motor development & ensuring participation	0.3	0.1
42	Opportunity for all children in creative activities	0.5	0.3
43	Opportunity for the children to recite rhymes & songs	1.2	1.0
44	Providing opportunity & ensuring children's participation in singing	1.3	1.0
45	Opportunity provided for children to participate in activities involving music & movement	1.1	0.8
46	Opportunity for children to participate in both individual & group recitation	1.1	1.1
47	All children's performance & participate in recitation & singing	1.0	0.8
48	Classroom arrangement & time provided by teacher for free play	0.5	0.3
49	Teacher provides opportunities for free play & interact with children during play	0.4	0.2
50	Comfort level of children with strangers	1.3	1.5
51	Teacher greets every child on arrival & departure	0.8	1.4
52	All children greet the teacher on arrivals & departure	0.7	1.5
53	Planning activities to ensure learning of cooperation & sharing	0.7	0.6
54	Liberal classroom environment for the children to interact with peers & teachers	1.4	1.0
55	Ensuring teacher-child interaction	1.3	1.0
56	Interaction between girls & boys during play time	1.0	0.9
57	Interaction between peers & with their teachers during meal/ snack time	1.1	1.0
58	Encouragement of social interaction among children during free play	1.3	0.9
59	Teacher encourages self expression in arts & craft activities & appreciation with guidance	0.5	0.3
60	No bias displayed by teacher towards gender	1.5	1.1
61	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	69.6	74.7
62	Inclusion of children with special needs during play	69.1	70.7
63	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	2.0	2.7

Both these programmes were assessed on a three-point rating scale on various quality domains, with the score ranging from 0 to 2 where 0 stood for absence of an indicator, 1 was average and 2 represented appropriate presence. Interestingly, when the mean scores of Anganwadis and private preschools are juxtaposed, one sees high and linear association indicating that both programmes are not significantly different from each other in overall quality on individual domains. In Figure below, the average scores of Anganwadis and private schools are plotted on x and y axis respectively. while the axis intersecting horizontally at 1 divides the plot into four quadrants indicating whether the programme scored well or poorly - the quadrant on the bottom left and bottom right represent the indicators on which both private preschools and Anganwadi centres had similar scores. The bottom left quadrant present the indicators where both the programme score less than the mean and top right presents the indicators on where they score more. Top left quadrant represents on which indicators the private preschools did better and on the indicators which the Anganwadi score more are presented in the bottom right quadrant.

Figure: Means scores of Anganwadi Centres and private preschools on different indicators of ECEQAS



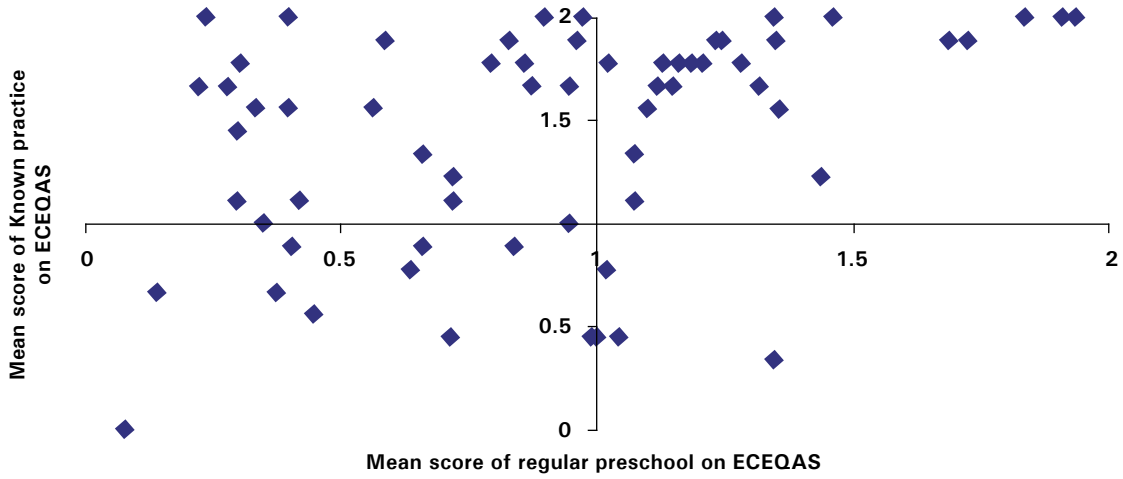
Appendix 5.5: Means scores of Regular preschools (Anganwadi centres and Private Preschools) and Known Practice in Rajasthan on ECEQAS quality indicators

S. No	Indicator of ECEQAS	Regular Preschools	Known Practice Centres
1	Toilet availability & use	0.8	0.9
2	Availability of water in toilet	0.6	0.6
3	Availability of clean water for drinking	1.5	1.2
4	No hazardous conditions around the centre	1.1	0.8
5	Clean surroundings around centre	1.1	1.1
6	Safety level of building that is maintained	1.4	1.7
7	Quality of infrastructure facilities for children with special needs	0.1	0.0
8	No noise pollution	1.7	1.9
9	Availability of classroom space for children to sit comfortably	1.2	1.9
10	Proper storage for teacher to keep material	0.9	1.8
11	Appropriate sitting facility for children	1.4	1.9
12	Clean classroom & sitting arrangement	1.5	2.0
13	Availability of space and equipment for outdoor play/ activities for all children	0.7	0.8
14	Availability of varieties of equipment/ materials for indoor learning/play activities	0.5	1.6
15	Use of indoor learning materials in the class	0.5	1.9
16	Flexible seating arrangements according to activities	1.0	1.8
17	Arrangement of the class according to activities	0.3	1.0
18	Display of material at children's level of understanding	1.0	1.7
19	Display of material produced by child	0.9	1.8
20	Teacher supervision of class	0.7	1.1
21	Age-wise composition of children in class	0.1	0.7
22	Teacher-child ratio less than 1:25 in class	1.9	2.0
23	Age appropriateness of activities ensured by teacher	1.1	1.3
24	Weekly/Daily schedule followed by teacher	1.1	1.7
25	Habit of washing hands by children	0.8	0.4
26	Regular checking of personal grooming of children	0.9	0.9
27	Independent toileting by children	1.7	1.9
28	Children's are able to eat independently	1.4	0.3
29	Most children understand language of teacher	1.8	2.0
30	Listening opportunities provided by teacher	0.9	2.0
31	Speaking opportunities provided by teacher	1.2	1.9
32	Use of language to extend children's thinking & express themselves	1.2	1.8
33	Activities & material for language development	0.8	1.9
34	Activities & materials for concepts formation	0.3	1.6
35	Activities & materials for developing cognitive skills	0.2	1.7
36	Activities for development of reading, writing & number readiness	0.8	1.2

S. No	Indicator of ECEQAS	Regular Preschools	Known Practice Centres
37	Does not conduct activities for reading, writing & number	0.3	1.1
38	Teacher ensuring children's participation in outdoor activities	0.4	0.7
39	Conduct activities for gross motor development	0.4	1.1
40	Opportunity for free & guided activities under supervision	0.3	1.4
41	Conduct activities for fine motor development & ensuring participation	0.2	2.0
42	Opportunity for all children in creative activities	0.4	2.0
43	Opportunity for the children to recite rhymes & songs	1.1	1.7
44	Providing opportunity & ensuring children's participation in singing	1.2	1.8
45	Opportunity provided for children to participate in activities involving music & movement	0.9	1.9
46	Opportunity for children to participate in both individual & group recitation	1.1	1.6
47	All children's performance & participate in recitation & singing	0.9	1.7
48	Classroom arrangement & time provided by teacher for free play	0.4	0.9
49	Teacher provides opportunities for free play & interact with children during play	0.3	1.8
50	Comfort level of children with strangers	1.4	1.6
51	Teacher greets every child on arrival & departure	1.1	0.4
52	All children greet the teacher on arrivals & departure	1.1	0.4
53	Planning activities to ensure learning of cooperation & sharing	0.7	1.3
54	Liberal classroom environment for the children to interact with peers & teachers	1.2	1.8
55	Ensuring teacher-child interaction	1.1	1.8
56	Interaction between girls & boys during play time	1.0	2.0
57	Interaction between peers & with their teachers during meal/ snack time	1.0	0.4
58	Encouragement of social interaction among children during free play	1.1	1.8
59	Teacher encourages self expression in arts & craft activities & appreciation with guidance	0.4	1.6
60	No bias displayed by teacher towards gender	1.3	2.0
61	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	72.1	51.7
62	Inclusion of children with special needs during play	69.9	51.9
63	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	2.3	2.0

Known practice in Rajasthan and regular preschools (private and anganwadi centes) were assessed on a three-point rating scale on various quality domains, with the score ranging from 0 to 2 where 0 stood for absence of an indicator, 1 was average and 2 represented appropriate presence. In the Figure below, the average scores of regular programmes (Anganwadis and private schools) are plotted on x and y axis respectively. While the axis intersecting horizontally at 1 divides the plot into four quadrants indicating whether the programme scored well or poorly - the quadrant on the bottom left and bottom right represent the indicators on which both regular and known practice had similar scores. The bottom left quadrant present the indicators where both the programme score less than the mean and top right presents the indicators on where they score more. Top left quadrant represents on which indicators in known practice did better than the regular programmes and on the indicators where regular programmes did better are presented in the bottom right quadrant.

Figure: Means scores of 'known practice' centres and regular preschools on different indicators of ECEQAS



Appendix 5.6: Correlation matrix between different quality domains as assessed in ECEQAS

	Physical setting and infrastructure	Learning and play aids	Classroom composition and organisation	Personal care and hygeine	Activities for language development	Activities for congitive development	Activities for motor development	Activities for creativity	Activities for social development	Teacher's disposition
Physical setting and infrastructure	1									
Learning and play aids	0.33	1								
Classroom composition and organisation	0.44	0.72	1							
Personal care and hygeine	0.44	-0.12	-0.02	1						
Activities for language development	0.38	0.43	0.6	0.1	1					
Activities for congitive development	0.3	0.71	0.71	-0.19	0.62	1				
Activities for motor development	0.32	0.68	0.73	-0.16	0.58	0.62	1			
Activities for creativity	0.41	0.64	0.73	0.04	0.75	0.59	0.67	1		
Activities for social development	0.45	0.44	0.56	0.28	0.7	0.45	0.45	0.65	1	
Teacher's disposition	0.43	0.48	0.69	0.06	0.72	0.63	0.6	0.66	0.65	1

Appendix 5.7: Percentage of primary school programmes with maximum score on different quality indicator (as assessed by ECEQAS Plus) across types of programmes and states

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	39	77	6	98	54	80	54
A	**Physical setting of the school**							
1	Toilet availability & use	56.41%	62.34%	66.67%	90.91%	96.30%	25.93%	87.50%
2	Availability of water in toilet	2.56%	20.78%	0.00%	36.36%	62.96%	14.81%	55.00%
3	Availability of clean water for drinking	64.10%	66.23%	66.67%	79.80%	94.44%	74.07%	90.00%
4	No hazardous conditions around the school	53.85%	48.05%	16.67%	52.53%	77.78%	37.04%	76.25%
5	Clean surroundings around school	53.85%	44.16%	16.67%	64.65%	87.04%	29.63%	81.25%
6	Safety level of building that is maintained	69.23%	28.57%	50.00%	58.59%	66.67%	53.70%	80.00%
7	Quality of infrastructure facilities for children with special needs	2.56%	0.00%	0.00%	3.03%	3.70%	1.85%	2.50%
8	No noise Pollution	71.79%	44.16%	100.00%	74.75%	66.67%	59.26%	51.25%
9	Availability of medical aid	2.56%	7.79%	0.00%	5.05%	7.41%	24.07%	17.50%
B	**Physical infrastructure of the school**							
10	Class conducted in appropriate space	84.62%	72.73%	83.33%	46.46%	88.89%	83.33%	90.00%
11	Availability of classroom space for children to sit comfortably	82.05%	25.97%	66.67%	36.36%	53.70%	44.44%	63.75%
12	Appropriate sitting facility for children	46.15%	14.29%	33.33%	26.26%	37.04%	33.33%	36.25%
13	Availability of space for out door play	10.26%	28.57%	0.00%	75.76%	92.59%	14.81%	57.50%
14	Appropriate facility available for children to keep their belonging	61.54%	25.97%	50.00%	33.33%	48.15%	29.63%	33.75%
15	Proper storage for teacher to keep material	53.85%	24.68%	33.33%	31.31%	42.59%	40.74%	50.00%
C	**Outdoor play**							
16	Availability and use of outdoor equipment	2.56%	6.49%	16.67%	3.03%	7.41%	7.41%	10.00%

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	**39**	**77**	**6**	**98**	**54**	**80**	**54**
D	**Learning and play material**							
17	Availability and appropriateness of activity based learning material	2.56%	0.00%	33.33%	5.05%	18.52%	9.26%	3.75%
18	Appropriate learning materials for children with special needs	5.13%	9.09%	66.67%	56.57%	51.85%	9.26%	5.00%
19	Availability of blackboard & chalk for teacher	2.56%	0.00%	0.00%	3.03%	1.85%	0.00%	1.25%
20	Availability of workbooks/activity books for children	69.23%	57.14%	83.33%	79.80%	85.19%	77.78%	85.00%
21	Availability of class library and its use	7.69%	10.39%	66.67%	5.05%	9.26%	14.81%	16.25%
22	Use of activity based learning materials	7.69%	27.27%	66.67%	8.08%	14.81%	9.26%	17.50%
23	Teacher's use of textbook	10.26%	2.60%	0.00%	0.00%	0.00%	3.70%	1.25%
E	**Classroom Arrangement**							
24	Flexible seating arrangements	25.64%	20.78%	50.00%	14.14%	9.26%	75.93%	57.50%
25	Inclusive seating arrangement	2.56%	10.39%	50.00%	13.13%	16.67%	31.48%	48.75%
26	Print rich environment	2.56%	2.60%	33.33%	2.02%	0.00%	5.56%	11.25%
27	Arrangement of the class according to activities	25.64%	18.18%	66.67%	4.04%	20.37%	11.11%	15.00%
28	Display of material produced by children	12.82%	18.18%	83.33%	23.23%	74.07%	22.22%	46.25%
29	Display of material	2.56%	0.00%	83.33%	0.00%	1.85%	3.70%	3.75%
30	Regular & relevant display of material	30.77%	19.48%	83.33%	0.00%	3.70%	7.41%	8.75%
F	**Classroom Planning**							
31	Teacher assigned to the class	33.33%	2.60%	50.00%	14.14%	11.11%	7.41%	5.00%
32	Individual planning for children	10.26%	0.00%	50.00%	1.01%	5.56%	3.70%	3.75%
33	Level/age appropriate activities	48.72%	3.90%	50.00%	20.20%	18.52%	7.41%	6.25%
34	Age/development appropriateness of activities ensured by teacher	7.69%	1.30%	66.67%	5.05%	1.85%	5.56%	6.25%

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	**39**	**77**	**6**	**98**	**54**	**80**	**54**
35	Weekly/Daily schedule followed by teacher	71.79%	54.55%	66.67%	49.49%	11.11%	87.04%	58.75%
36	Teacher supervision of class	89.74%	96.10%	100.00%	64.65%	85.19%	87.04%	96.25%
G	**Classroom Management**							
37	Teacher-child ratio less than 1:30 in class	15.38%	7.79%	0.00%	49.49%	5.56%	38.89%	62.50%
38	Age-wise composition of children in class	33.33%	59.74%	33.33%	32.32%	92.59%	61.11%	87.50%
39	Class composition	7.69%	7.79%	83.33%	17.17%	0.00%	50.00%	43.75%
40	Addressing multi-grade classrooms	7.69%	0.00%	83.33%	4.04%	1.85%	14.81%	6.25%
41	Cooperative learning encouraged by the teacher	64.10%	36.36%	100.00%	67.68%	53.70%	81.48%	52.50%
H	**Personal Hygeine**							
42	Habit of washing hands by children	7.69%	15.58%	16.67%	19.19%	27.78%	9.26%	16.25%
43	No toileting accidents	94.87%	90.91%	100.00%	95.96%	98.15%	94.44%	96.25%
44	Regular checking of personal grooming of children	10.26%	12.99%	16.67%	7.07%	37.04%	7.41%	27.50%
45	Children come well groomed	7.69%	54.55%	16.67%	29.29%	70.37%	11.11%	52.50%
46	Keeping the classroom clean	10.26%	12.99%	16.67%	9.09%	40.74%	16.67%	40.00%
47	Planned meal time	61.54%	62.34%	66.67%	16.16%	22.22%	92.59%	96.25%
I	**Teaching Process**							
48	Teacher introduces a new lesson/ concept/activity innovatively	5.13%	6.49%	66.67%	3.03%	7.41%	9.26%	5.00%
49	Participation level of children	41.03%	40.26%	100.00%	21.21%	44.44%	22.22%	31.25%
50	Encouraging Children's questions	33.33%	46.75%	83.33%	46.46%	64.81%	18.52%	31.25%
51	Asking children questions	2.56%	5.19%	50.00%	4.04%	14.81%	3.70%	2.50%
52	Promoting Higher order thinking	2.56%	1.30%	16.67%	2.02%	11.11%	1.85%	5.00%

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	39	77	6	98	54	80	54
J	**Activity for language development**							
53	Most children understand language of teacher	97.44%	96.10%	100.00%	92.93%	98.15%	96.30%	87.50%
54	Using bilingualism/multilingualism as a resource	25.64%	24.68%	83.33%	5.05%	9.26%	72.22%	71.25%
55	Listening opportunities provided by teacher	5.13%	3.90%	33.33%	6.06%	9.26%	14.81%	10.00%
56	Speaking opportunities provided by teacher	15.38%	11.69%	50.00%	19.19%	20.37%	9.26%	11.25%
57	Opportunities and activities for reading readiness	12.82%	7.79%	83.33%	7.07%	5.56%	7.41%	8.75%
58	Opportunities and activities for reading	5.13%	2.60%	33.33%	0.00%	0.00%	7.41%	5.00%
59	Opportunities and activities for writing readiness	2.56%	2.60%	16.67%	3.03%	5.56%	7.41%	5.00%
60	Opportunities and activities for learning writing	2.56%	3.90%	16.67%	15.15%	31.48%	12.96%	12.50%
K	**Environmental understanding**							
61	Activities & materials for concept formation related to environment	2.56%	0.00%	33.33%	0.00%	0.00%	1.85%	1.25%
L	**Activity for maths**							
62	Activities for number readiness	2.56%	0.00%	33.33%	0.00%	0.00%	0.00%	1.25%
63	Activities & materials for developing cognitive skills	15.38%	2.60%	33.33%	0.00%	0.00%	3.70%	7.50%
64	Activities for learning maths concept	7.69%	5.19%	16.67%	13.13%	12.96%	18.52%	12.50%
M	**Development of Creativity**							
65	Classroom arrangement & time provided by teacher for free play	12.82%	1.30%	33.33%	7.07%	1.85%	0.00%	5.00%

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	**39**	**77**	**6**	**98**	**54**	**80**	**54**
66	Opportunity for all children in creative activities	2.56%	2.60%	50.00%	2.02%	0.00%	0.00%	1.25%
67	Opportunity for children to participate in both individual & group creative activities	5.13%	1.30%	33.33%	10.10%	11.11%	0.00%	1.25%
68	Opportunity for divergent thinking	2.56%	0.00%	16.67%	1.01%	0.00%	9.26%	6.25%
69	Teacher provides opportunities for free choice play & interact with children during play	2.56%	1.30%	16.67%	0.00%	0.00%	5.56%	2.50%
N	**Assessment and Monitoring**							
70	Monitoring children's activity/learning	28.21%	40.26%	100.00%	25.25%	38.89%	22.22%	26.25%
71	Response to learning difficulties	38.46%	29.87%	100.00%	33.33%	40.74%	12.96%	16.25%
72	Nature of Homework	2.56%	2.60%	50.00%	11.11%	20.37%	29.63%	1.25%
73	Load of home work	2.56%	1.30%	16.67%	0.00%	3.70%	42.59%	30.00%
74	Feedback to children	28.21%	28.57%	100.00%	34.34%	38.89%	25.93%	38.75%
O	**Activity for social development**							
75	Teacher greets children on arrival & departure	48.72%	49.35%	100.00%	69.70%	83.33%	87.04%	85.00%
76	All children greet the teacher on arrivals & departure	15.38%	23.38%	33.33%	33.33%	44.44%	61.11%	78.75%
77	Ensuring teacher-child interaction	20.51%	41.56%	50.00%	37.37%	59.26%	68.52%	76.25%
78	Liberal classroom environment for the children to interact with peers & teachers	7.69%	2.60%	66.67%	5.05%	3.70%	5.56%	6.25%
79	Planning activities to ensure learning of cooperation & sharing	38.46%	29.87%	100.00%	22.22%	14.81%	33.33%	18.75%
80	Interaction between peers & with their teachers during meal/snack time	23.08%	19.48%	100.00%	35.35%	31.48%	25.93%	25.00%
81	Comfort level of children with strangers	5.13%	0.00%	0.00%	0.00%	3.70%	44.44%	28.75%

S. No.	Domains/Indicators	RAJASTHAN			ASSAM		TELANGANA	
		Government Schools	Private School	Known Practice	Government Schools	Private School	Government Schools	Private School
	Sample (N)	39	77	6	98	54	80	54
P	**Teacher's Personality**							
82	Quality of teacher's voice	87.18%	83.12%	100.00%	79.80%	83.33%	94.44%	88.75%
83	Teacher has child friendly disposition/ behaviour	41.03%	25.97%	100.00%	32.32%	42.59%	38.89%	30.00%
Q	**Teacher Approach Learning Process**							
84	Teacher's response to children' errors	5.13%	0.00%	16.67%	2.02%	0.00%	5.56%	5.00%
85	Teacher responsive to the needs & problems of childrene	28.21%	32.47%	100.00%	46.46%	42.59%	24.07%	25.00%
86	Teacher encourages self expression in arts & craft activities & appreciation with guidanc	84.62%	93.51%	83.33%	86.87%	85.19%	96.30%	85.00%
87	Disciplining of children	2.56%	0.00%	16.67%	1.01%	1.85%	92.59%	86.25%
88	Teacher uses positive guidance as incentive for good performance	0.00%	1.30%	16.67%	0.00%	0.00%	1.85%	2.50%
89	No use of corporal punishment	0.00%	0.00%	0.00%	2.02%	0.00%	1.85%	0.00%
R	**Teacher Senstivity**							
90	Teacher demonstrate sensitivity & awareness regarding needs of children with special needs	82.05%	92.21%	83.33%	91.92%	96.30%	88.89%	92.50%
91	Teacher demonstrate sensitivity and awareness regarding children from other socially disadvantaged groups such as tribal, SC & OBC	28.21%	31.17%	100.00%	50.51%	48.15%	42.59%	43.75%
92	Inclusion of children with special needs during play	56.41%	49.35%	100.00%	74.75%	68.52%	68.52%	41.25%
93	No bias displayed by teacher towards gender	48.72%	51.95%	83.33%	49.49%	53.70%	50.00%	60.00%
94	Teacher makes efforts to break gender stereotypes	12.82%	6.49%	33.33%	26.26%	40.74%	42.59%	42.50%

Appendix 6.1: Effect of ECE participation on end-line SRS controlling for various individual, household and other background characteristics for all states together, state FE versus OLS, with robust SEs

	All sampled kids		Sub-sample of kids with no primary school exposure	
	State level FEs	OLS	State level FEs	OLS
Participation characteristics				
Number of exposures to preschool classes	3.865***	4.448***	21.67*	35.43***
	(1.078)	(1.112)	(12.26)	(13.06)
Number of times exposures to pre- school classes ECE squared	-0.337	-0.181	-3.164	-5.262**
	(0.204)	(0.212)	(2.043)	(2.174)
Number of exposures to primary school	2.548***	2.544***		
	(0.568)	(0.611)		
Scores				
SRS- Baseline score	0.182***	0.211***	0.167***	0.192***
	(0.0215)	(0.0220)	(0.0254)	(0.0263)
School/ ECE centre characteristics at age 5 Management type (Reference category: Government)				
Private	11.05***	7.065***	13.21***	8.604***
	(0.970)	(0.868)	(1.334)	(1.217)
Other	9.900***	4.713	9.945***	3.715
	(3.253)	(3.289)	(3.766)	(3.791)
Child characteristics				
Gender (Reference category: Boys)	-0.572	-0.411	-0.894	-0.748
	(0.461)	(0.467)	(0.634)	(0.643)
Age	2.813***	2.855***	2.213*	2.731**
	(0.921)	(0.934)	(1.147)	(1.163)
Current grade (Reference category: 0 grade or LKG/ UKG/ ECE centre)				
Grade 1	8.063***	6.949***		
	(1.340)	(1.300)		
Grade 2	17.18***	15.61***		
	(1.890)	(1.914)		
Household characteristics				
Mother's education	0.254***	0.336***	0.203***	0.288***
	(0.0627)	(0.0730)	(0.0678)	(0.0814)
Caste (Reference category: SC)				
Scheduled tribe	1.231	2.499*	2.904	4.187*
	(1.412)	(1.492)	(2.149)	(2.288)
Other Backward caste	-0.189	0.302	-2.021	-1.107
	(0.940)	(1.009)	(1.453)	(1.617)
General caste	2.839**	5.184***	2.963	5.984***
	(1.434)	(1.521)	(1.880)	(2.084)

	All sampled kids		Sub-sample of kids with no primary school exposure	
	State level FEs	OLS	State level FEs	OLS
Affluence as per ownership of consumer durable index (Reference category: Low)				
Medium	-0.0762	-2.343***	-0.189	-2.856***
	(0.771)	(0.834)	(1.006)	(0.994)
High	2.011**	-1.355	1.559	-2.047*
	(0.881)	(0.979)	(1.156)	(1.174)
Home language (Reference: Home language is not state language)	2.152*	3.831***	2.947**	3.691***
	(1.099)	(1.012)	(1.454)	(1.299)
Learning environment				
Household reading materials (Reference category: None)	1.941**	4.345***	2.366**	5.164***
	(0.792)	(0.775)	(1.040)	(0.977)
Observations	6,785	6,785	3,791	3,791

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6.2 : Effect of ECE participation on end-line SRS controlling for various individual, household and other background characteristics for all states together, by individual states, with robust SEs

	Outcome variable: SRS-v4 (only RJ, full sample)	Outcome variable: SRS-v4 (only RJ, sub- sample with no primary school exposure)	Outcome variable: SRS-v4 (only TG, full sample)	Outcome variable: SRS-v4 (only TG, sub- sample with no primary school exposure)	Outcome variable: SRS-v4 (only AS, full sample)	Outcome variable: SRS-v4 (only AS, sub- sample with no primary school exposure)
Participation characteristics						
Number of exposures to pre-school classes^^	3.452***	3.324***	0.401	4.197	-1.155	-1.577
	(1.101)	(1.172)	(3.627)	(5.405)	(7.154)	(3.154)
Number of times exposures to pre-school classes squared	-0.418*		0.391		-0.0179	
	(0.212)		(0.410)		(1.187)	
Number of exposures to primary school	3.084***		1.666		-6.743*	
	(0.587)		(3.167)		(3.432)	
Scores						
SRS- Baseline score	0.300***	0.226***	0.0806**	0.113**	0.159***	0.163***
	(0.0319)	(0.0444)	(0.0364)	(0.0447)	(0.0375)	(0.0374)
School/ ECE centre characteristics of the 4th visit						
Management type (Reference category: Government)						
Private	9.559***	10.87***	12.52***	13.26***	13.19***	14.77***
	(0.959)	(1.366)	(1.886)	(2.449)	(2.434)	(2.628)
Other	8.380***	7.494**			22.36***	24.53***
	(3.003)	(3.259)			(3.783)	(3.749)
Child characteristics						
Gender (Reference category: Boys)	-2.045***	-2.632***	0.680	-0.621	0.208	0.0938
	(0.581)	(0.911)	(0.811)	(1.170)	(0.994)	(1.034)
Age	4.711***	5.056**	2.690	1.570	0.708	1.224
	(1.317)	(2.039)	(1.799)	(2.650)	(1.530)	(1.578)
Current grade (Reference category: 0 grade or LKG/ UKG/ ECE centre)						
Grade 1	1.812		13.83***		21.55***	
	(1.298)		(2.305)		(5.132)	
Grade 2	10.47***		23.52***		54.41***	
	(1.946)		(3.529)		(5.046)	
Household characteristics						
Mother's education	0.561***	0.449**	0.0238	-0.0239	0.278***	0.243***
	(0.170)	(0.189)	(0.0822)	(0.119)	(0.0946)	(0.0872)

	Outcome variable: SRS-v4 (only RJ, full sample)	Outcome variable: SRS-v4 (only RJ, sub- sample with no primary school exposure)	Outcome variable: SRS-v4 (only TG, full sample)	Outcome variable: SRS-v4 (only TG, sub- sample with no primary school exposure)	Outcome variable: SRS-v4 (only AS, full sample)	Outcome variable: SRS-v4 (only AS, sub- sample with no primary school exposure)
Caste (Reference category: SC)						
Scheduled tribe	-0.148	0.373	1.265	7.968**	-2.109	-1.027
	(1.397)	(1.841)	(2.377)	(3.273)	(3.393)	(3.568)
Other Backward caste	0.419	-0.440	1.781*	0.751	-6.696*	-5.701*
	(0.894)	(1.255)	(1.072)	(1.896)	(3.653)	(3.400)
General caste	0.655	0.858	2.000	2.501	-0.299	0.896
	(1.191)	(2.014)	(2.393)	(3.683)	(3.488)	(3.262)
Affluence as per ownership of consumer durable index (Reference category: Low)						
Medium	1.119	1.399	-2.533	-2.774	-0.449	-0.384
	(0.898)	(1.207)	(1.726)	(2.711)	(1.273)	(1.302)
High	3.828***	5.076***	-2.039	-1.674	-0.460	-1.299
	(1.048)	(1.372)	(2.006)	(3.048)	(1.682)	(1.695)
Home language (Reference: Home language is not state language)	-0.333	-0.513	0.506	2.135	4.455**	5.115**
	(1.231)	(1.393)	(1.727)	(2.811)	(2.158)	(2.327)
Learning environment						
Household reading materials (Reference category: None)	1.954**	2.815**	0.147	1.632	1.929	1.729
	(0.841)	(1.189)	(1.989)	(2.022)	(1.864)	(1.994)
Observations	2,811	1,162	1,929	785	2,045	1,844

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
^^^ In case of models specific to children with no primary school exposure, this is a dummy variable of full exposure, that is, exposure to ECE during all 4 rounds of data collection versus less than full exposure (that is, exposure to ECE 3 times or less). This has been done because there were not enough observations in less exposure categories.

Appendix 6.3: Effect of ECE participation on end-line SRS controlling for ECE quality and various individual, household and other background characteristics for all states together, state FE versus OLS, with robust SEs (Strand B)

	State FE	OLS
Participation Characteristics (Reference category: No participation)		
Participation in pre- school classes/primary school between age 4-5 years	10.79*** (3.342)	14.20*** (3.799)
Scores		
Baseline School Readiness Score at age 4	0.200*** (0.0359)	0.218*** (0.0358)
School/ECE programme attended by child at age 5 (Reference category: Anganwadi Centre)		
Private preschool	12.32*** (2.073)	9.898*** (2.673)
Known practice in Telangana and Assam	3.177 (4.666)	-0.14 (5.24)
Known practice in Rajatshan	11.37*** (3.992)	10.64*** (3.951)
Government primary school	8.836*** (2.126)	6.719*** (2.435)
Quality of the programme attended by the child from age 4 to 5		
Facilities in the centre	7.454** (2.935)	8.500*** (3.069)
Location of the centre	3.726 (3.183)	1.63 (3.323)
Physical infrastructure of the centre	-7.311 (4.427)	-6.909 (4.748)
Outdoor space and indoor learning and play material in the classroom	-4.857* (2.723)	-0.751 (2.829)
Classroom planning	-1.311 (3.609)	-3.154 (4.157)
Classroom management	-1.423 (4.100)	-5.957 (4.33)
Activities for language development	-0.433 (1.846)	0.0509 (1.989)
Activities for cognitive development	3.930** (1.844)	2.55 (2.041)
Activities for motor development	0.0369 (1.368)	1.169 (1.363)
Activities for creativity	-0.0430 (0.412)	-0.0804 (0.437)
Activities for social development	-0.511 (2.570)	-4.2 (2.735)
Teacher disposition	4.059 (4.985)	4.018 (5.313)

	State FE	OLS
Child Characteristics		
Gender (Reference category: Boys)	0.380 (0.864)	0.659 (0.891)
Age	0.305* (0.172)	0.310* (0.17)
Household Characteristic **Mother's education (Reference category: No schooling)**		
Maternal education: primary	1.204 (1.777)	1.915 (1.831)
Maternal education: Secondary and above	3.002* (1.512)	3.115* (1.602)
Caste (Reference category: Non- general)	-0.210 (1.613)	0.885 (1.61)
Affluence as per consumer durables	11.43* (6.814)	5.799 (5.952)
Learning environment		
Availability of print material	4.820 (6.961)	8.355 (6.853)
Family support in learning	2.369 (2.772)	4.792** (2.304)
Observations	1,500	1,500

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7.1: Description of competencies assessed by Strand A

Early Grade Assessment Tool 2013 (Age 6)			
Competency		Details	Point Value
Cognitive	Identification and classification of birds and animals	Children were shown pictures of three birds and three animals and asked to identify and classify the same.	14
	Identification of colours	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all yellow coloured cut-outs.	4
	Identification of shapes	Children were shown three shapes (circle, triangle, and rectangle) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all square shaped cut-outs.	4
	Seriation	Children were given five picture cards of a tree in varying sizes and asked to arrange them in order of size (ascending or descending).	2
	Memory	Children were first shown a picture with 6 items and then shown a picture with 5 items and asked to identify the missing object.	1
	Sequential thinking	Children were shown picture cards depicting the stages of water filling in a bucket and were asked to arrange the cards in a sequence.	1
	Logical Reasoning (Pattern)	Children were shown an incomplete pattern with two repetitions and were asked to complete additional sequences.	1
	Number Conservation	Children were given the Piagetian task of number conservation. First an equal number of counters are placed in two parallel rows and children were asked if any row had more counters. Then the counters are spread /expanded in front of them and children were asked if either row had more counters.	2
Emergent Math	Single-digit number recognition	Children were asked to identify 5 single-digit numbers.	5
	Double-digit number recognition	Children were asked to identify 5 double-digit numbers.	5
	Number Counting and Picture Matching	Children were shown a set of numbers and asked to identify and match these to pictures with objects.	2
	Word Problem: Addition	Children were asked a single-digit addition word problem.	1
	Word Problem: Subtraction	Children were asked a single-digit subtraction word problem.	1
	Numeric problem: Addition	Children were given a single-digit addition sum to solve.	1
	Numeric problem: Subtraction	Children were given a single-digit (no carryover) subtraction sum to solve.	1

Early Grade Assessment Tool 2013 (Age 6)			
Competency		**Details**	**Point Value**
Emergent Literacy	Writing readiness	Children were asked to write their names (First names or nick names).	1
	Book handling	Children were given a picture book and were questioned about the front of the book, directionality of the text and page turning.	3
	Picture description	Children were shown a picture and asked to say three sentences about the same.	6
	Vernacular letter recognition	Children were asked to identify a set of 5 letters (Hindi, Telugu or Assamese).	5
	Word and Picture matching	Children were given three simple words (Hindi, Telugu or Assamese) and asked to match these with a picture representing the word.	6
	Phonetics	Children were shown three pictures and asked to identify the starting sound of each word.	3
		Children were also asked to name three words starting from the sound 'ka'.	3
	English letter recognition	Children were asked to identify a set of 5 English letters.	5
TOTAL SCORE			**77**

Early Grade Assessment Tool 2014 (Age 7)			
Competency		Details	Point Value
Cognitive	Identification and classification of birds and animals	Children were shown pictures of three birds and three animals and asked to identify and classify the same.	14
	Identification of colours	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all yellow coloured cut-outs.	3
	Identification of shapes	Children were shown three shapes (circle, triangle, and rectangle) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all square shaped cut-outs.	3
	Seriation	Children were given five picture cards of a tree in varying sizes and asked to arrange them in order of size (ascending or descending).	2
	Sequential thinking	Children were shown picture cards depicting the stages of water filling in a bucket and were asked to arrange the cards in a sequence.	1
	Logical Reasoning (Pattern)	Children were shown an incomplete pattern with two repetitions and were asked to complete additional sequences.	1
	Number Conservation	Children were given the Piagetian task of number conservation. First an equal number of counters are placed in two parallel rows and children were asked if any row had more counters. Then the counters are spread /expanded in front of them and children were asked if either row had more counters.	2
Emergent Math	Single-digit number recognition & concept of relativity	Children were asked to identify 5 single-digit numbers. They were also asked to identify smallest and largest number.	7
	Double-digit number recognition & concept of relativity	Children were asked to identify 5 double-digit numbers. They were also asked to point to the smallest and largest number	7
	Word Problem: Addition	Children were asked a single-digit addition word problem.	1
	Word Problem: Subtraction	Children were asked a single-digit subtraction word problem.	1
	Numeric problem: Addition	Children were given a single-digit addition sum to solve.	1
	Numeric problem: Subtraction	Children were given a single-digit (w/o borrow) subtraction sum to solve.	1
	Numeric problem: Addition	Children were given a '2 digit + 1 digit' addition sum to solve.	1
	Numeric problem: Subtraction	Children were given a '2 digit - 1 digit' (with borrow) subtraction sum to solve.	1

Early Grade Assessment Tool 2014 (Age 7)			
Competency		Details	Point Value
Language	Picture description	Children were shown a picture and asked to say three sentences about the same.	6
	Vernacular letter recognition	Children were asked to identify a set of 5 letters (Hindi, Telugu or Assamese).	5
	Simple word reading and Picture matching	Children were given three simple words (Hindi, Telugu or Assamese) and asked to match these with a picture representing the word.	6
	Matra Word Reading	Children were given five words with matra to read.	5
	Reading Ability and Comprehension	Children were given a four line text to read (Std 1 level text) and were asked two comprehension questions from it.	6
English	English letter recognition	Children were asked to identify a set of 5 English letters.	5
	English word reading	Children were asked to read a set of 5 English words and were asked the meaning of the words read	2
	English sentence reading	Children were asked to read any 2 out of the 4 given sentences and were asked the meaning of the sentences read.	2
TOTAL SCORE			**83***

* The question on classification of birds & animals was not included in the total score. Hence, the effective total score for analysis in this report is 69.

Early Grade Assessment Tool 2015 (Age 8)			
Competency		**Details**	**Point Value**
Cognitive	Identification and classification of birds and animals	Children were shown pictures of three birds and three animals and asked to identify and classify the same.	Not included in total score
	Identification of colours	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all yellow coloured cut-outs.	3
	Identification of shapes	Children were shown three shapes (circle, triangle, and rectangle) and asked to identify the same. If the child was able to identify all colours, s/he was asked to separate out all square shaped cut-outs.	3
	Seriation	Children were given five picture cards of a tree in varying sizes and asked to arrange them in order of size, from smallest to the largest.	1
	Logical Thinking	Children were shown an incomplete pattern with two repetitions and were asked to complete additional sequences using the coloured cut outs given to them.	1
	Sequential thinking	Children were shown picture cards depicting the stages of water filling in a bucket and were asked to arrange the cards in a sequence.	1
	Number Conservation	Children were given the Piagetian task of number conservation. First an equal number of counters are placed in two parallel rows and children were asked if any row had more counters. Then the counters are spread /expanded in front of them and children were asked if either row had more counters.	2
Mathematics	Number Recognition	Children were asked to identify 5 single-digit numbers.	5
		Children were asked to identify 5 double-digit numbers. (only of the child could identify at least 2 single digit numbers)	5
		Children were asked to identify 5 three-digit numbers. (only of the child could identify at least 2 double digit numbers)	5
	Word Problems (Oral)	Children were asked a single-digit addition word problem.	1
		Children were asked a single-digit subtraction word problem.	1
	Numerical Problems	Children were given a single-digit addition sum to solve.	1
		Children were given a single-digit (w/o borrow) subtraction sum to solve.	1
		Children were given a '2 digit + 1 digit' addition sum to solve.	1
		Children were given a '2 digit - 1 digit' (with borrow) subtraction sum to solve.	1
		Children were given 3 digit into 1 digit multiplication sum	1
		Children were given 3 digit divided by 2 digit division sum	1
	Division (Application based)	Cut-outs of the monkeys and the bananas are placed in front of the child and the following question is asked There are 3 monkeys and 12 bananas. If the bananas are to be divided equally among all three monkeys, then how many bananas would each monkey get? a) The child was able to solve orally? b) The child was able to solve by arranging cards?	Not included in total score

Early Grade Assessment Tool 2015 (Age 8)			
Competency		**Details**	**Point Value**
Language	Picture description	Children were shown a picture and asked to say three things in complete sentences about the picture.	6
	Vernacular letter recognition	Children were asked to identify a set of 5 letters (Hindi, Telugu or Assamese).	5
	Simple word reading and Picture matching	Children were given 5 simple words (Hindi, Telugu or Assamese) and asked to match these with a picture representing the word.	10
	Matra Word Reading	Children were given five words with matra to read.	5
	Reading Ability (Std 1 level) & comprehension	Children were given a four line text to read (Std 1 level text) and were asked two comprehension questions from it	6
	Reading Ability (Std 2 level)	Children were given a Std 2 level text to read and were asked two comprehension questions	2*
English	English letter recognition	Children were asked to identify a set of 5 English letters.	5
	English word reading	Children were asked to read a set of 5 English words and were asked the meaning of the words read	2
	English sentence reading	Children were asked to read any 2 out of the 4 given sentences and were asked the meaning of the sentences read.	2
TOTAL SCORE			**75**

Appendix 7.2: Description of competencies assessed by Strand B

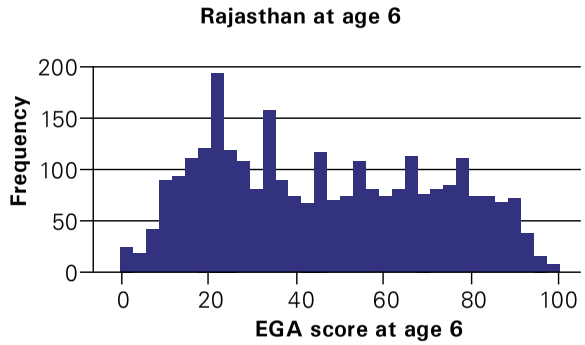
Early Grade Assessment Tool 2013 (Age 6)			
S. No.	**Competency**		**Activity**
1	**COGNITIVE CONCEPTS AND SKILLS**	**Identification and classification of birds and animals**	Children were shown pictures of three birds and three animals and asked to identify and classify into categories of birds and animals.
2		**Identification and classification of shapes and colour**	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify all yellow coloured cut-outs.
			Children were shown three shapes using cut-outs (circle, triangle, rectangle) and asked to identify and classify only square cut-outs.
3		**Logical reasoning**	Children were given a worksheet with a pattern which they were asked to complete.
4		**Sequential thinking**	Children were shown picture cards depicting water filling in a bucket and were asked to arrange the cards in a sequence.
5		**Number conservation**	Children were given the Piagetian task of number conservation, where an equal number of counters are placed in two parallel rows and the children are asked if any row has more counters and later the counters are spread/expanded in front of them and they are asked if either row has more counters.
6		**Seriation**	Children were given five picture cards of trees of varying sizes and asked to place them in a sequence of smallest to biggest.
7	**LANGUAGE READINESS CONCEPTS**	**Phonemic awareness**	Children were shown three pictures and asked which sound the word starts with and later asked which two picture words start with the same sound.
			Children were also asked to name three words starting from the sound 'ka'.
8		**Book handling**	Children were given a picture book and were questioned about the front of the book, directionality of the text, etc.
9		**Picture reading**	Children were given a picture and asked to talk about the picture in three sentences.
10	**NUMBER CONCEPTS**	**Number recognition**	Children were asked to identify 5 single digit and 5 double digit numbers.
11		**Number value**	Children were presented with a set of single digit numbers and asked to identify the smallest number and then they were presented with a set of double digit numbers and asked to identify the greatest number.
12		**Number matching**	Children were presented with a worksheet that had set of objects which they were asked to count and match with the correct number (given symbols).
13		**Addition and subtraction**	Children were asked simple addition, subtraction sums orally and also given a worksheet where they were given written sums for addition and subtraction.
14	**LANGUAGE CONCEPTS**	**Vernacular letter recognition**	Children were given a set of 5 letters from the vernacular language (Hindi, Telugu and Assamese) and were asked to identify.
15		**English letter recognition**	Children were given a set of 5 letters from English language and were asked to identify.
16		**Vernacular word picture matching**	Children were given three simple words in the vernacular language and asked to match them with the picture of the objects.
17		**English word picture matching**	Children given three simple words in English language and asked to match them with the picture of the objects.

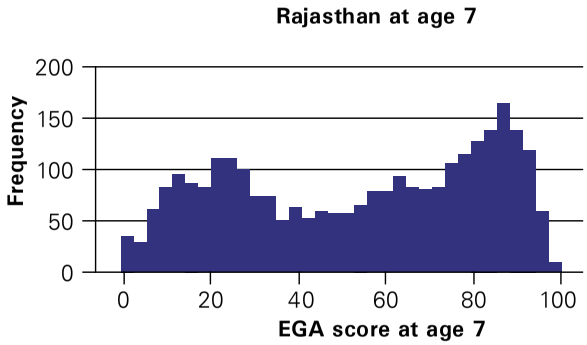
Early Grade Assessment Tool 2014 (Age 7)			
S. No.	**Competency**		**Activity**
1	**COGNITIVE CONCEPTS AND SKILLS**	**Identification and classification of shapes and colour**	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify all yellow coloured cut-outs.
			Children were shown three shapes using cut-outs (circle, triangle, rectangle) and asked to identify and classify only square cut-outs.
			Children were asked to classify all the yellow squares
2		**Logical reasoning**	Children were given a worksheet with two pattern which they were asked to complete.
3		**Sequential thinking**	Children were shown picture cards depicting water filling in a bucket and were asked to arrange the cards in a sequence.
			Children were shown picture cards depicting eating of apple and were asked to arrange the cards in a sequence.
4		**Number conservation**	Children were given the Piagetian task of number conservation, where an equal number of counters are placed in two parallel rows and the children are asked if any row has more counters and later the counters are spread/ expanded in front of them and they are asked if either row has more counters.
5		**Seriation**	Children were given five picture cards of trees of varying sizes and asked to place them in a sequence of smallest to biggest.
6	**LANGUAGE READINESS CONCEPTS**	**Phonemic awareness**	Children were shown three pictures and asked which sound the word starts with and later asked which two picture words start with the same sound.
			Children were also asked to name three words starting from the sound 'ka'.
7		**Picture reading**	Children were shown a picture of a rainy day with some children and asked how they spend a day if it was raining and the school was closed.
8	**NUMBER CONCEPTS**	**Number recognition and comparison**	Children were asked to identify 4 single digit and 4 double digit numbers.
9			Children were given the same number cards to identify the smallest and greatest number.
10		**Addition and subtraction**	Children were asked simple addition, subtraction sums orally and also given a worksheet where they were given written sums for addition and subtraction.
11	**LANGUAGE CONCEPTS**	**Listening comprehension**	A story was read out to the children and based on the same some factual and inferential questions were asked.
12		**Vernacular letter recognition and making words**	Children were given a set of 9 letters from the vernacular language (Hindi, Telugu and Assamese) and were asked to identify.
			Children were asked to make words from the given letters
13		**Vernacular word picture matching**	Children were given five simple words in the vernacular language and asked to match them with the picture of the objects.
14		**Vernacular letter recognition and making words**	Children were given a set of 6 letters from English language and were asked to identify.
			Children were asked to make words from the given letters
15		**English word picture matching**	Children given three simple words in English language and asked to match them with the picture of the objects.

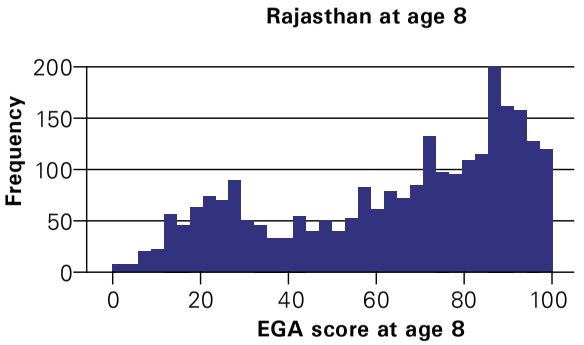
Early Grade Assessment Tool 2015 (Age 8)			
S. No.	**Competency**		**Activity**
1	**COGNITIVE CONCEPTS AND SKILLS**	**Identification and classification of shapes and colour**	Children were shown three colours cut-outs (yellow, red and blue) and asked to identify all yellow coloured cut-outs.
			Children were shown three shapes using cut-outs (circle, triangle, rectangle) and asked to identify and classify only square cut-outs.
			Children were asked to classify all the yellow squares
2		**Logical reasoning**	Children were given a worksheet with two pattern which they were asked to complete.
3		**Sequential thinking**	Children were shown picture cards depicting water filling in a bucket and were asked to arrange the cards in a sequence.
			Children were shown picture cards depicting eating of apple and were asked to arrange the cards in a sequence.
4		**Number conservation**	Children were given the Piagetian task of number conservation, where an equal number of counters are placed in two parallel rows and the children are asked if any row has more counters and later the counters are spread/ expanded in front of them and they are asked if either row has more counters.
5		**Seriation**	Children were given five picture cards of trees of varying sizes and asked to place them in a sequence of smallest to biggest.
6		**Concept of direction**	Children were given a picture card with a chair in the middle and two items on either side and asked to identify the picture on the right or left of the chair.
7		**Concept of measurement**	Children were given picture 6 picture cards of different objects of the same size and asked to arrange the card in order of their weight.
			Children were given a picture with a number of paths to reach an object and asked to identify the shortest route
8		**Concept of symmetry**	Children were given six picture cards of objects and asked which of the pbjects can be divided into two equal halfs after giving an example.
9	**LANGUAGE READINESS CONCEPTS**	**Phonemic awareness**	Children were shown three pictures and asked which sound the word starts with and later asked which two picture words start with the same sound.
			Children were also asked to name three words starting from the sound 'ka'.
10		**Picture reading**	Children were shown a picture of children playing and given a hypothetical situation and asked what would they do incase they were in the situation.
11	**NUMBER CONCEPTS**	**Number recognition and comparison**	Children were asked to identify 4 single digit and 4 double digit numbers.
12			Children were given the same number cards to identify the smallest and greatest number.
13		**Addition and subtraction**	Children were asked simple addition, subtraction sums orally and also given a worksheet where they were given written sums for addition and subtraction.
14		**Multiplication and Division**	Children were asked simple multiplication and division sums orally and also given a worksheet.

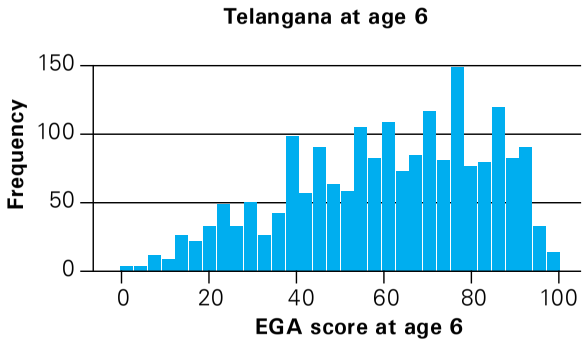
Early Grade Assessment Tool 2015 (Age 8)			
S. No.	**Competency**		**Activity**
15	**LANGUAGE CONCEPTS**	**Reading comprehension**	Children were given a simple story to the children and asked to read it and later were asked some factual and inferential question.
16		**Vernacular letter recognition and making words**	Children were given a set of 9 letters from the vernacular language (Hindi, Telugu and Assamese) and were asked to identify.
			Children were asked to make words from the given letters
17		**Vernacular word picture matching**	Children were given five simple words in the vernacular language and asked to match them with the picture of the objects.
18		**Vernacular letter recognition and making words**	Children were given a set of 6 letters from English language and were asked to identify.
			Children were asked to make words from the given letters
19		**English word picture matching**	Children given three simple words in English language and asked to match them with the picture of the objects.

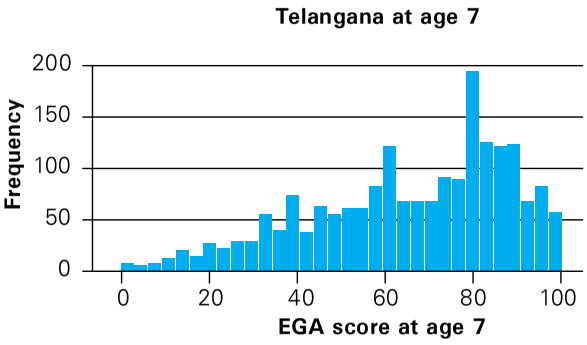
Appendix 7.3: Distribution of early grade assessment scores by states

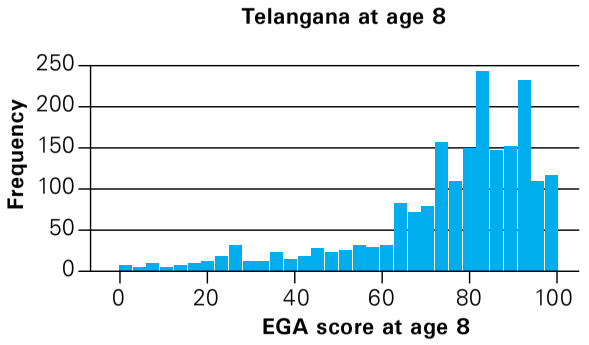


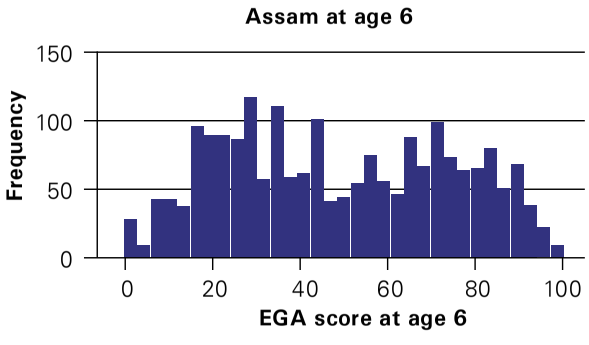


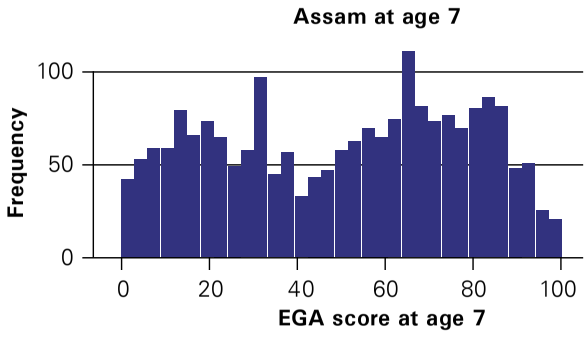


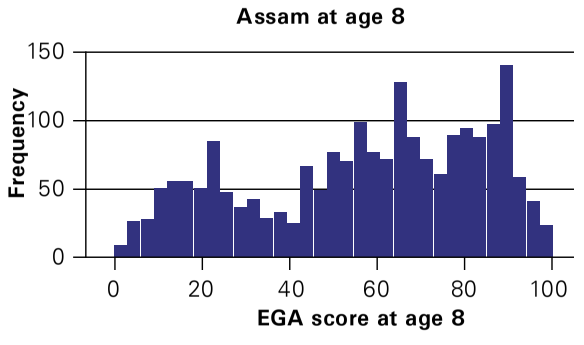












Appendix 7.4: Effect of SRS on early grade learning outcomes controlling for background individual, household and other characteristics for all states together (state FE versus OLS, with robust SEs)

	Outcome variable: EGA-age 6 (with state level FE)	Outcome variable: EGA-age 6 (OLS)	Outcome variable: EGA-age 7 (with state level FE)	Outcome variable: EGA-age 7 (OLS)	Outcome variable: EGA-age 8 (with state level FE)	Outcome variable: EGA-age 8 (OLS)
Scores						
Early grade assessment score- age 7					0.539***	0.547***
					(0.0210)	(0.0208)
Early grade assessment score- age 6			0.525***	0.528***	0.132***	0.136***
			(0.0270)	(0.0265)	(0.0151)	(0.0146)
SRS- Endline score- age 5	0.346***	0.364***	0.105***	0.0978***	0.0203	0.00893
	(0.0263)	(0.0249)	(0.0190)	(0.0189)	(0.0151)	(0.0153)
SRS- Baseline score- age 4	0.110***	0.143***	0.0432**	0.0423**	-0.0143	-0.014
	(0.0195)	(0.0205)	(0.0194)	(0.0202)	(0.0147)	(0.0151)
Participation characteristics						
Number of exposures to preschool classes	4.707***	6.517***	3.306***	3.048***	0.797*	0.448
	(0.760)	(0.828)	(0.619)	(0.650)	(0.459)	(0.460)
Number of exposures to preschool classes squared	-0.306***	-0.405***	-0.250***	-0.229***	-0.0509	-0.0267
	(0.102)	(0.104)	(0.0508)	(0.0531)	(0.0373)	(0.0371)
Number of exposures to primary school	3.031***	3.838***	1.328***	1.323***	0.322	0.280
	(0.527)	(0.562)	(0.458)	(0.467)	(0.334)	(0.349)
Observed attendance^^	2.364***	2.648***	0.788***	0.871***	0.667***	0.823***
	(0.367)	(0.366)	(0.202)	(0.202)	(0.185)	(0.193)
School/ ECE centre management type of the 12th, 10th, 7th or 4th visits respectively						
Management type (Reference category: Government)						
Private	13.89***	11.68***	9.009***	9.432***	6.796***	7.091***
	(0.998)	(0.905)	(0.998)	(0.883)	(0.744)	(0.712)
Other	7.240	3.806	7.558***	7.958***	2.940*	3.131**
	(4.661)	(3.786)	(2.466)	(2.149)	(1.582)	(1.340)

	Outcome variable: EGA-age 6 (with state level FE)	Outcome variable: EGA-age 6 (OLS)	Outcome variable: EGA-age 7 (with state level FE)	Outcome variable: EGA-age 7 (OLS)	Outcome variable: EGA-age 8 (with state level FE)	Outcome variable: EGA-age 8 (OLS)
Child characteristics						
Gender (Reference category: Boys)	-0.0804	-0.0666	-0.353	-0.462	0.134	-0.0421
	(0.551)	(0.563)	(0.507)	(0.513)	(0.428)	(0.425)
Age	2.695***	2.665***	0.0926	0.123	-0.407	-0.344
	(0.976)	(0.988)	(0.892)	(0.899)	(0.773)	(0.778)
Current grade	7.231***	6.821***	5.140***	5.319***	1.580***	1.738***
	(0.729)	(0.742)	(0.535)	(0.537)	(0.407)	(0.414)
Household characteristics						
Mother's education	0.422***	0.450***	0.209***	0.189***	0.0650	0.0358
	(0.0785)	(0.0794)	(0.0626)	(0.0592)	(0.0428)	(0.0420)
Caste (Reference category: SC)						
Scheduled tribe	-1.300	-1.376	-2.336*	-2.770**	0.128	-0.499
	(1.428)	(1.436)	(1.246)	(1.229)	(1.046)	(1.066)
Other Backward caste	0.350	-0.0931	-1.495*	-1.768**	-1.223*	-1.651***
	(0.880)	(0.918)	(0.764)	(0.795)	(0.632)	(0.636)
General caste	2.215	0.855	0.894	-0.343	1.645	-0.419
	(1.432)	(1.446)	(1.282)	(1.295)	(1.025)	(0.936)
Affluence as per ownership of consumer durable index (Reference category: Low)						
Medium	2.321***	2.683***	1.931**	2.838***	1.413**	2.858***
	(0.860)	(0.840)	(0.862)	(0.862)	(0.688)	(0.719)
High	5.396***	4.712***	3.466***	4.443***	1.646**	3.113***
	(1.068)	(1.031)	(1.050)	(1.023)	(0.790)	(0.810)
Learning environment						
Household reading materials (Reference category: None)	2.308***	4.609***	2.373***	2.224***	1.317**	1.191*
	(0.852)	(0.864)	(0.722)	(0.728)	(0.631)	(0.631)
Observations	5,227	5,227	5,273	5,273	5,313	5,313

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
^^ Observed attendance is a count from wave 3 to the relevant assessment round- that is, from wave 3 to wave 7 (in which case it can range from 0 to 4); wave 3 to wave 10 (range of observed attendance count is then from 0 to 7) and wave 3 to wave 12 (in which case it ranges from 0 to 11). It was not included in the regression models for Chapter 6 because the first two visits (Oct- 2011-December 2011 and February- March 2013) had many missing values. Overall the correlation between participation and attendance though significant is not strong.

Appendix 7.5: Effect of SRS on early grade learning outcomes controlling for background individual, household and other characteristics for individual states with robust SEs

	EGA at age 6			EGA at age 7			EGA at age 8		
	Rajasthan	Telangana	Assam	Rajasthan	Telangana	Assam	Rajasthan	Telangana	Assam
Scores									
Early grade assessment score- age 7							0.711***	0.465***	0.361***
							(0.0259)	(0.0370)	(0.0386)
Early grade assessment score- age 6				0.781***	0.425***	0.266***	0.0896***	0.133***	0.111***
				(0.0253)	(0.0393)	(0.0400)	(0.0257)	(0.0290)	(0.0275)
SRS- Endline score- age 5	0.614***	0.0930**	0.287***	0.0792***	0.0322	0.153***	-0.00441	0.0171	0.0522**
	(0.0289)	(0.0369)	(0.0390)	(0.0275)	(0.0295)	(0.0334)	(0.0204)	(0.0268)	(0.0263)
SRS- Baseline score- age 4	0.106***	0.0628**	0.0971***	-0.0445	0.110***	0.0337	-0.0582***	0.0134	0.0335
	(0.0333)	(0.0300)	(0.0322)	(0.0273)	(0.0266)	(0.0289)	(0.0214)	(0.0209)	(0.0317)
Participation characteristics									
Number of exposures to preschool classes	1.289*	6.676	1.955	1.166*	(2.622)	7.943***	-0.308	-4.827**	4.786*
		(5.189)	(5.132)	(0.593)		(2.238)	(0.453)	(2.015)	(2.549)
Number of exposures to preschool classes squared	0.122	-0.114	-0.301	-0.0449	-0.179*	-0.374**	0.00436	0.0274	-0.0238
	(0.105)	(0.180)	(0.636)	(0.0567)	(0.104)	(0.150)	(0.0446)	(0.0669)	(0.111)
Number of exposures to primary school	2.033***	7.347	2.324	0.922**	-4.973*	4.847**	0.134	-5.481***	4.853**
	(0.540)	(5.215)	(2.615)	(0.433)	(2.614)	(2.031)	(0.329)	(1.925)	(1.856)
Observed attendance	1.364***	1.881**	3.677***	1.240***	0.453	-0.0712	0.664***	0.316	0.0376
	(0.354)	(0.721)	(0.845)	(0.208)	(0.541)	(0.370)	(0.171)	(0.352)	(0.410)
School/ ECE centre management type									
Management type (Reference category: Government)									
Private	15.34***	19.79***	8.201***	6.373***	7.553***	10.71***	5.132***	4.503***	8.262***
	(0.955)	(2.509)	(2.115)	(1.145)	(2.018)	(2.290)	(0.868)	(1.456)	(1.764)
Other	11.32***		-8.350***	4.703*			2.534***	-40.14***	
	(3.314)		(1.803)	(2.542)			(0.840)	(2.902)	
Child characteristics									

	EGA at age 6			EGA at age 7			EGA at age 8		
	Rajasthan	Telangana	Assam	Rajasthan	Telangana	Assam	Rajasthan	Telangana	Assam
Gender (Reference category: Boys)	-0.266	1.782*	-0.113	0.218	2.023**	-2.374**	0.428	0.777	-0.808
	(0.752)	(0.996)	(1.050)	(0.606)	(0.956)	(1.005)	(0.477)	(0.776)	(0.972)
Age	4.006***	4.471**	-1.940	0.576	0.772	-1.761	0.464	-0.741	-0.246
	(1.185)	(1.897)	(1.765)	(1.274)	(1.739)	(1.568)	(1.116)	(1.189)	(1.581)
Current grade	5.210***	10.42***	6.105***	1.181**	7.103***	9.271***	-0.360	1.850**	5.876***
	(0.766)	(1.467)	(1.972)	(0.520)	(1.143)	(0.956)	(0.436)	(0.808)	(0.992)
Household characteristics									
Mother's education	0.743***	0.271***	0.319**	0.305**	0.0818	0.290***	0.0665	0.104**	0.0228
	(0.174)	(0.0770)	(0.128)	(0.127)	(0.0729)	(0.110)	(0.0498)	(0.0423)	(0.0872)
Caste (Reference category: SC)									
Scheduled tribe	-0.0465	-6.460**	4.508	-1.009	-6.838***	4.427*	1.100	-0.555	-1.064
	(1.912)	(2.688)	(3.041)	(1.486)	(2.435)	(2.627)	(1.154)	(2.563)	(2.425)
Other Backward caste	-0.144	-0.540	3.552	-1.198	-1.837	1.221	-0.696	-0.574	-3.116
	(0.936)	(1.429)	(2.984)	(0.908)	(1.170)	(2.520)	(0.718)	(0.950)	(2.535)
General caste	-0.714	-1.367	6.930**	0.989	-3.944	7.482***	0.859	-0.268	3.128
	(1.520)	(2.997)	(2.964)	(1.293)	(2.887)	(2.587)	(0.792)	(2.169)	(2.540)
Affluence as per ownership of consumer durable index (Reference category: Low)									
Medium	0.601	3.090	3.943***	0.249	-0.776	3.150**	1.432*	2.113	1.888
	(1.101)	(1.941)	(1.429)	(0.919)	(1.411)	(1.483)	(0.863)	(1.484)	(1.311)
High	3.581***	4.062*	8.569***	1.437	-0.912	7.346***	1.299	3.093*	2.400
	(1.298)	(2.401)	(2.138)	(1.147)	(1.784)	(1.982)	(0.964)	(1.689)	(1.517)
Learning environment									
Household reading materials (Reference category: None)	0.293	1.293	2.236	0.140	3.663**	4.587***	0.421	1.822	3.317*
	(1.005)	(2.083)	(1.788)	(0.763)	(1.694)	(1.427)	(0.667)	(1.326)	(1.860)
Observations	2,289	1,458	1,480	2,333	1,458	1,482	2,364	1,458	1,491

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7.6: Effect of SRS on early grade learning outcomes controlling for background individual, household and other characteristics for individual states - Strand B with robust SES

	EGA at age 6				
	OLS (with all states)	All states (with state level FE)	Assam	Rajasthan	Telangana
Scores					
Early grade assessment age 7					
Early grade assessment age 6					
SRS- End-line score age 5	0.293***	0.287***	0.163**	0.322***	0.324***
	(0.0333)	(0.0314)	(0.0604)	(0.0505)	(0.0434)
SRS-Baseline score age 4	0.109***	0.0914***	0.0141	0.174***	0.124**
	(0.0360)	(0.0340)	(0.0462)	(0.0516)	(0.0567)
Participation Characteristics					
Participation in preschool classes/ primary school (Reference category: No participation)	5.874***	1.391	-3.529	0.905	0.0716
	(1.391)	(1.276)	(2.173)	(1.404)	(3.736)
Institution type (Reference category: Anganwadi Centre for EGA at 6 and EGA at 7 (OLS, State FE and Rajasthan); Private Schools for EGA at 7 (Telangana and Assam) and EGA at 8					
Private School	15.46***	18.49***	20.09***	4.246	12.13**
	(2.291)	(2.734)	(3.224)	(3.379)	(4.757)
Known practice in Telangana and Assam	-6.809***	-5.061			-8.691***
	(2.230)	(3.941)			(2.822)
Known practice in Rajasthan	22.19***	29.26***		16.05***	
	(2.330)	(3.183)		(2.910)	
Government schools	9.779***	9.311***	11.91***	-3.371	-3.326
	(2.659)	(2.964)	(3.865)	(2.990)	(4.742)
Child Characteristics					
Gender (Reference category: Boys)	1.014	0.790	2.267	-1.234	0.797
	(0.848)	(0.811)	(1.777)	(0.980)	(1.257)
Age	0.522***	0.497***	0.324	0.682***	0.173
	(0.128)	(0.125)	(0.304)	(0.222)	(0.188)
Current Grade	6.425***	8.048***	12.52***	4.918***	12.21***
	(0.943)	(1.026)	(2.007)	(0.704)	(1.565)
Household Characteristics Mother education (Reference category: No schooling)					
Primary education	1.224	0.159	1.387	-0.544	-2.114
	(1.473)	(1.414)	(2.629)	(1.106)	(3.017)
Secondary and above	7.233***	4.508***	5.541**	3.160*	2.758
	(1.079)	(1.218)	(2.137)	(1.783)	(2.080)
Caste (Reference category: Non-general)	4.708***	4.198***	1.824	6.362***	0.217
	(1.192)	(1.349)	(1.984)	(1.720)	(1.711)
Affluence as per ownership of consumer durable index	-6.020*	-0.531	-22.82***	4.298	1.210
	(3.290)	(4.918)	(4.491)	(3.980)	(5.802)
Learning environment					
Reading material	12.04**	12.76**	10.28	14.05*	15.51**
	(5.782)	(5.438)	(14.88)	(7.355)	(7.240)
Family support in learning	8.930***	3.778*	2.037	9.185**	-0.637
	(1.937)	(1.998)	(3.069)	(3.786)	(2.328)
Observations	1,552	1,552	390	501	661

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	EGA at age 7				
	OLS (with all states)	All states (with state level FE)	Assam	Rajasthan	Telangana
Scores					
Early grade assessment age 7					
Early grade assessment age 6	0.517***	0.513***	0.447***	0.791***	0.375***
	(0.0558)	(0.0530)	(0.0661)	(0.0381)	-0.085
SRS- End-line score age 5	0.283***	0.276***	0.188***	0.194***	0.372***
	(0.0393)	(0.0365)	(0.0600)	(0.0508)	-0.052
SRS-Baseline score age 4	0.0746**	0.0654*	0.0524	0.0122	0.101
	(0.0348)	(0.0347)	(0.0672)	(0.0399)	-0.063
Participation Characteristics					
Participation in preschool classes/ primary school (Reference category: No participation)	1.775	1.614	9.670*	0.953	2.679
	(1.867)	(2.006)	(5.370)	(1.795)	-7.06
Institution type (Reference category: Anganwadi Centre for EGA at 6 and EGA at 7 (OLS, State FE and Rajasthan); Private Schools for EGA at 7 (Telangana and Assam) and EGA at 8					
Private School	14.80***	14.54***		19.86***	
	(2.816)	(2.760)		(1.958)	
Known practice in Telangana and Assam					
Known practice in Rajasthan	10.52**	11.31**		14.89***	
	(4.446)	(4.407)		(3.311)	
Government schools	12.58***	11.87***	1.684	15.04***	-4.345
	(2.835)	(2.812)	(2.715)	(2.182)	-3.472
Child Characteristics					
Gender (Reference category: Boys)	-0.0209	-0.245	-2.330	0.0527	1.308
	(0.988)	(0.989)	(2.040)	(1.324)	-1.898
Age	0.0185	0.0346	0.271	-0.431**	0.091
	(0.170)	(0.169)	(0.244)	(0.172)	-0.311
Current Grade	1.939**	2.224***	4.852**	0.336	3.967**
	(0.736)	(0.754)	(1.986)	(0.544)	-1.506
Household Characteristics Mother education (Reference category: No schooling)					
Primary education	4.111**	3.513**	5.555*	2.880	1.244
	(1.640)	(1.562)	(3.077)	(2.162)	-2.776
Secondary and above	5.437***	4.967***	5.136	1.963	6.587***
	(1.368)	(1.400)	(3.551)	(2.991)	-1.667
Caste (Reference category: Non-general)	1.643	0.793	-3.908*	2.464	5.391*
	(1.649)	(1.682)	(2.134)	(2.277)	-2.896
Affluence as per ownership of consumer durable index	5.825	10.99***	1.645	13.85**	5.198
	(3.685)	(3.764)	(7.471)	(5.261)	-6.025
Learning environment					
Reading material	3.690	1.931	36.71**	-9.875	1.944
	(7.614)	(7.269)	(16.37)	(11.93)	-10.75
Family support in learning	1.869	-0.679	0.882	-9.061***	2.779
	(2.210)	(2.442)	(3.793)	(2.787)	-4.143
Observations	1,565	1,565	397	505	663

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	EGA at age 8				
	OLS (with all states)	All states (with state level FE)	Assam	Rajasthan	Telangana
Scores					
Early grade assessment age 7	0.374***	0.390***	0.267***	0.636***	0.309***
	(0.0408)	(0.0384)	(0.0670)	(0.0333)	(0.0550)
Early grade assessment age 6	0.205***	0.193***	0.0635	0.202***	0.201***
	(0.0332)	(0.0329)	(0.0709)	(0.0385)	(0.0469)
SRS- End-line score age 5	0.0658***	0.0966***	0.135***	0.0421	0.107***
	(0.0222)	(0.0221)	(0.0458)	(0.0368)	(0.0328)
SRS-Baseline score age 4	0.0164	0.0389*	0.0252	0.00167	0.114***
	(0.0230)	(0.0222)	(0.0293)	(0.0341)	(0.0344)
Participation Characteristics					
Participation in preschool classes/ primary school (Reference category: No participation)	3.804*	1.868	-3.149	1.250	11.68**
	(2.034)	(2.311)	(5.268)	(1.989)	(4.810)
Institution type (Reference category: Anganwadi Centre for EGA at 6 and EGA at 7 (OLS, State FE and Rajasthan); Private Schools for EGA at 7 (Telangana and Assam) and EGA at 8					
Private School					
Known practice in Telangana and Assam					
Known practice in Rajasthan	-2.813**	-1.632		-1.948	
	(1.271)	(1.020)		(1.492)	
Government schools	-6.855***	-5.354***	-14.35***	-5.864**	1.269
	(1.647)	(1.596)	(2.549)	(2.214)	(2.379)
Child Characteristics					
Gender (Reference category: Boys)	0.240	0.722	-0.585	-0.150	2.911**
	(0.813)	(0.790)	(1.230)	(1.116)	(1.391)
Age	-0.0102	-0.0355	0.183	-0.131	-0.0745
	(0.136)	(0.131)	(0.183)	(0.142)	(0.261)
Current Grade	1.372***	1.045***	2.968***	0.251	0.658
	(0.273)	(0.259)	(0.747)	(0.269)	(0.468)
Household Characteristics Mother education (Reference category: No schooling)					
Primary education	1.145	2.064	5.220*	1.477	0.971
	(1.271)	(1.321)	(2.639)	(1.376)	(2.608)
Secondary and above	-0.0266	-0.103	0.827	0.867	2.465
	(1.398)	(1.360)	(2.551)	(1.502)	(2.155)
Caste (Reference category: Non-general)	-4.769***	-2.621*	-0.318	-6.084***	-4.148*
	(1.468)	(1.453)	(2.682)	(1.123)	(2.329)
Affluence as per ownership of consumer durable index	11.09***	1.326	1.303	-3.053	4.860
	(3.132)	(2.629)	(8.897)	(3.717)	(5.012)
Learning environment					
Reading material	4.346	9.384*	9.770	10.22	9.149
	(4.640)	(4.796)	(15.17)	(8.394)	(7.417)
Family support in learning	-5.39e-06	4.033**	5.780	-1.014	4.964**
	(1.607)	(1.689)	(3.672)	(3.002)	(2.297)
Observations	1,593	1,593	405	525	663

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7.7: Effect of SRS on early grade learning outcomes controlling for ECE quality characteristices, background individual, household and other characteristics for individual states with robust SES (Strand B)

	EGA at age 6		EGA at age 7		EGA at age 8	
	OLS (with all states)	All states (with state level FE)	OLS (with all states)	All states (with state level FE)	OLS (with all states)	All states (with state level FE)
Scores						
Early grade assessment age 7					0.368***	0.386***
					(0.0398)	(0.0383)
Early grade assessment age 6			0.509***	0.510***	0.191***	0.188***
			(0.0544)	(0.0528)	(0.0346)	(0.0339)
SRS- End-line score age 5	0.293***	0.286***	0.288***	0.276***	0.0758***	0.0972***
	(0.0323)	(0.0311)	(0.0388)	(0.0366)	(0.0220)	(0.0225)
SRS-Baseline score age 4	0.105***	0.0898***	0.0735**	0.0626*	0.0231	0.0420*
	(0.0354)	(0.0335)	(0.0349)	(0.0349)	(0.0224)	(0.0219)
Participation Characteristics						
Participation in preschool classes/primary school (Reference category: No participation)	4.478***	1.145	0.935	1.453	2.877	2.001
	(1.461)	(1.393)	(1.828)	(2.007)	(1.968)	(2.283)
Institution type (Reference category: Anganwadi Centre for EGA at 6 and EGA at 7 (OLS, State FE and Rajasthan); Private Schools for EGA at 7 (Telangana and Assam) and EGA at 8						
Private School	14.44***	18.10***	14.08***	14.46***		
	(2.525)	(2.794)	(2.416)	(2.397)		
Known practice in Telangana and Assam	-8.161***	-5.326				
	(2.380)	(3.942)				
Known practice in Rajasthan	16.34***	26.87***	7.933*	7.862*	-6.093***	-4.447**
	(3.280)	(3.539)	(4.440)	(4.497)	(1.808)	(1.730)
Government schools	8.427***	8.924***	11.69***	11.71***	-7.196***	-5.306***
	(2.793)	(2.953)	(2.456)	(2.439)	(1.649)	(1.642)

	EGA at age 6		EGA at age 7		EGA at age 8	
	OLS (with all states)	All states (with state level FE)	OLS (with all states)	All states (with state level FE)	OLS (with all states)	All states (with state level FE)
Programme quality						
ECEQAS quality score of the programme attended by the child	0.308**	0.114	0.219*	0.281**	0.433***	0.288**
	(0.121)	(0.116)	(0.128)	(0.112)	(0.108)	(0.120)
Child Characteristics						
Gender (Reference category: Boys)	0.927	0.753	-0.0284	-0.280	0.323	0.708
	(0.850)	(0.815)	(0.997)	(0.995)	(0.813)	(0.795)
Age	0.530***	0.501***	0.0143	0.0307	0.00815	-0.0201
	(0.128)	(0.126)	(0.169)	(0.166)	(0.132)	(0.128)
Current Grade	6.590***	8.056***	2.008***	2.210***	1.384***	1.034***
	(0.866)	(1.003)	(0.732)	(0.749)	(0.268)	(0.262)
Household Characteristics Mother education (Reference category: No schooling)						
Primary education	1.192	0.167	3.952**	3.375**	0.893	1.943
	(1.465)	(1.411)	(1.642)	(1.547)	(1.289)	(1.353)
Secondary and above	6.894***	4.513***	5.020***	4.818***	-0.515	-0.0520
	(1.102)	(1.225)	(1.325)	(1.385)	(1.346)	(1.351)
Caste (Reference category: Non-general)	5.007***	4.261***	1.537	0.415	-4.365***	-2.556*
	(1.203)	(1.333)	(1.635)	(1.631)	(1.421)	(1.414)
Affluence as per ownership of consumer durable index	-6.076*	-0.515	5.347	10.43***	10.26***	1.040
	(3.224)	(4.934)	(3.626)	(3.761)	(3.014)	(2.598)
Learning environment						
Reading material	11.79**	12.49**	4.778	2.641	5.139	9.378*
	(5.544)	(5.303)	(7.573)	(7.376)	(4.879)	(4.943)
Family support in learning	8.555***	3.764*	1.699	-0.551	-0.433	3.987**
	(1.917)	(1.999)	(2.199)	(2.415)	(1.568)	(1.710)
Observations	1,552	1,552	1,565	1,565	1,586	1,586

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7.8: Effect of SRS on early grade learning outcomes controlling for disaggregated ECE quality characteristices, background individual, household and other characteristics for individual states with robust SES (Strand B)

	EGA at age 6 with state level FE	EGA at age 7 with state level FE	EGA at age 8 with state level FE
Scores			
Early grade assessment age 7			0.375***
			(0.0374)
Early grade assessment age 6		0.498***	0.191***
		(0.0557)	(0.0329)
SRS- End-line score age 5	0.283***	0.236***	0.0925***
	(0.0309)	(0.0338)	(0.0220)
SRS-Baseline score age 4	0.0918***	0.0828**	0.0449*
	(0.0341)	(0.0327)	(0.0228)
Participation Characteristics			
Participation in preschool classes/primary school (Reference category: No participation)	1.934	3.525	2.769
	(1.620)	(2.275)	(2.044)
Institution type (Reference category: Anganwadi Centre for EGA at 6 and EGA at 7 (OLS, state FE and Rajasthan); Private schools for EGA at 7 (Telangana and Assam) and EGA at 8			
Private school	18.03***	18.56***	
	(2.869)	(2.911)	
Known practice in Telangana and Assam	-4.326		
	(3.931)		
Known practice in Rajasthan	26.90***	10.99**	-2.817
	(4.224)	(5.448)	(2.282)
Government schools	9.251***	16.68***	-5.750***
	(2.914)	(2.953)	(1.498)
Programme quality			
Physical infrastructure of the school	2.012	7.767***	1.049
	(1.854)	(2.574)	(1.851)
Physical infrastructure of the classroom	-1.889	-0.325	-0.659
	(1.660)	(2.014)	(1.372)
Outdoor play	1.759	-4.097**	1.059
	(1.134)	(1.979)	(1.365)
Learning material	-2.556	6.537**	-2.354
	(2.911)	(2.938)	(2.748)
Classroom arrangement	1.560	-4.767**	-1.408
	(1.862)	(2.352)	(1.684)
Classroom planning	2.377*	2.986	2.817*
	(1.366)	(1.917)	(1.604)
Class management	-2.981	-3.033	-3.279*
	(2.235)	(2.438)	(1.915)
Teaching process	3.671*	1.291	-1.001
	(1.868)	(2.717)	(1.983)

	EGA at age 6 with state level FE	EGA at age 7 with state level FE	EGA at age 8 with state level FE
Activities for language development	-4.445*	-7.659*	2.887
	(2.328)	(4.062)	(2.364)
Activity for environment learning	1.504	1.871	-2.388
	(1.720)	(2.343)	(3.687)
Activities for maths	2.162	0.357	1.231
	(1.588)	(1.867)	(1.170)
Activities for creativity	0.369	-1.986	-3.311
	(2.175)	(2.824)	(2.473)
Mode of assessment	-1.989	3.372	1.928
	(1.732)	(2.147)	(1.501)
Activities for social development	-0.578	0.320	2.775
	(2.445)	(2.918)	(2.561)
Teacher personality	0.365	3.976*	1.002
	(2.133)	(2.152)	(2.203)
Learning process used by teacher	-0.745	-2.352	0.526
	(2.478)	(3.179)	(2.612)
Teacher sensitivity	2.415	-1.607	-0.871
	(2.044)	(1.965)	(1.540)
Child Characteristics			
Gender (Reference category: Boys)	0.645	-0.0473	1.097
	(0.844)	(1.001)	(0.796)
Age	0.513***	0.0162	0.0290
	(0.125)	(0.165)	(0.133)
Current Grade	8.027***	2.486***	1.088***
	(0.990)	(0.799)	(0.252)
Household Characteristics Mother education (Reference category: No schooling)			
Primary education	0.373	3.785**	2.236
	(1.457)	(1.508)	(1.448)
Secondary and above	4.416***	4.083***	0.467
	(1.194)	(1.283)	(1.363)
Caste (Reference category: Non-general)	3.839***	0.201	-2.467*
	(1.308)	(1.619)	(1.369)
Affluence as per ownership of consumer durable index	-1.535	9.028***	0.634
	(4.715)	(3.279)	(2.612)
Learning environment			
Reading material	13.89***	3.869	6.320
	(5.087)	(6.839)	(4.398)
Family support in learning	4.163**	-0.166	4.101**
	(2.045)	(2.216)	(1.641)
Observations	1,552	1,514	1,560

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7.9 : Description on tasks included in each domain with item wise scoring

Language					Math					Cognitive				
Activity	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**
Book Handling	Children were given a picture book and were questioned about the front of the book, directionality of the text and page turning.	NA	NA	3	Single-Digit Number Recognition	Ask the child to recognise all single digit numbers	5	5	5	Classification of animals and birds	Identification of Owl, Zebra, Elephant, Parrot, Deer, Crow	Not included	Not included	Not included
						Ask the child to identify smallest and largest number	NA	2	1		Classification of birds and animals			
Picture Description	Children were shown a picture and asked to say three sentences about the same.	Not included	Not included	6	Double-Digit Number Recognition	Ask child to recognise all double digit numbers	5	5	5	Classification of colours and shape	identify all 3 colours individually : Red, Yellow, Blue	3	3	3
						Ask the child to identify smallest and largest number	NA	2	1		Identify the 3 shapes - Circle, Square and Triangle individually	3	3	3
Letter Recognition (Vernacular)	Ask the child to recognise letters: र,त,व,ज,द	5	5	5	Three-Digit Number Recognition	Ask the child to identify three digit numbers	5	NA	NA	Seriation	Children were given five picture cards of a tree in varying sizes and asked to arrange them in order of size	1	1	1

	Language				Math					Cognitive				
Activity	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**
Word Reading (Vernacular)	As the child to read words: 5 simple (non-matra) words	5	3	3	Word Problems (simple)	Word problem - Add	2	2	2	Logical Reasoning	Ask child to identify shapes/ colours in the pattern and then ask him to complete the pattern.	1	1	1
	The children were shown 6 pictures of which 5 were related to the words asked in 9b. The child was asked to match the pictures with the words.	5	3	3		Word problem - Sub								
Matra Word Reading (Vernacular)	As the child to read words: Matra words	5	5	NA	Number Counting and Picture Matching	Children were shown a set of numbers and asked to identify and match these to pictures with objects.	NA	NA	2	Sequential Thinking	Ask the child to sequentially arrange cards of a particular action-water bucket sequence	1	1	1

	Language				Math					Cognitive				
Activity	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**	**Activity**	**Detail of Question**	**Age 8 2015**	**Age 7 2014**	**Age 6 2013**
Reading Ability and Comprehension (Vernacular)	Show the child Std 1 level text and ask him to read.	2	2	NA	Numeric operations	Simple addition	1	1	1	Number Conservation	Children were given the Piagetian task of number conservation. First an equal number of counters were placed in two parallel rows and children were asked if any row had more counters. Then the counters are spread / expanded in front of them and children were asked if either row had more counters.	1	1	1
	Oral Comprehension Question	Not included	4	NA		Addition with carry over	1	1	NA					
Reading Ability and Comprehension Std 2 (Vernacular)	Show the child Std 2 level text and ask him to read.	Not included	NA	NA		Simple Subtraction	1	1	1					
	Oral Comprehension Question	4				Subtraction with borrow	1	1	NA					
						Multiplication	1	NA	NA					
						Division	1	NA	NA					
TOTAL		**26**	**22**	**20**	**TOTAL**		**23**	**20**	**18**	**Total**		**10**	**10**	**10**

Appendix 7.10 Performance of children on math, language and cognitive domains based on performance on school readiness tasks

			Average % score								
			MATHS			LANGUAGE			COGNITIVE		
Endline SRI competency	N	%	EGA 1 Age 6	EGA 2 Age7	EGA 3 Age 8	EGA 1 Age 6 (Language)	EGA 2 Age7 (Language)	EGA 3 Age 8 (Language)	EGA 1 Age 6 (Cognitive)	EGA 2 Age7 (Cognitive)	EGA 3 Age 8 (Cognitive)
Pre Number Concept											
Could do	3969	38.4	57.3	70.8	68.7	48.4	57.1	73.7	44.6	59.5	70.4
Couldn't do	2475	61.6	37.8	51.5	52.7	31.9	39.0	57.6	30.6	43.8	58.2
Difference			19.5***	19.3***	15.9***	16.4***	18.1***	16.0***	14.0***	15.6***	12.2***
Sequential Thinking											
Able to identify and describe sequence	3423	46.9	58.5	71.6	69.6	49.8	57.7	74.7	44.6	59.5	71.2
Unable to identify/ describe sequence	3021	53.1	42.2	56.2	56.3	35.2	43.5	61.1	34.4	48.1	60.9
Difference			16.3***	15.5***	13.4***	14.6***	14.3***	13.6***	10.2***	11.4***	10.3***
Matching Numbers											
Could match all 3	4166	35.4	69.9	82.3	78.6	58.4	67.6	82.4	50.5	66.9	76.8
Couldn't match all	2278	64.7	38.8	53.1	53.8	33.1	40.6	59.3	33.0	46.1	59.7
Difference			31.1***	29.2***	24.9***	25.2***	26.9***	23.1***	17.5***	20.8***	17.1***
Space Concept											
Could do	5786	89.8	38.8	51.8	53.4	43.2	51.4	68.6	40.2	54.5	66.5
Couldn't do	658	10.2	51.1	64.7	63.6	31.6	39.6	57.8	30.5	44.1	58.7
Difference			12.3***	13.0***	10.2***	11.6***	11.7***	10.8***	9.6***	10.4***	7.8***
Classification of Birds and Animals											
Could do	2414	37.5	59.5	72.5	69.8	50.6	59.6	75.5	48.4	62.6	72.2
Couldn't do	4030	62.5	44.0	58.0	58.2	36.9	44.5	62.7	33.7	48.0	61.8
Difference			15.5***	14.5***	11.5***	13.7***	15.1***	12.7***	14.7***	14.6***	10.3***
Following Instructions											
Could follow	4754	26.2	52.9	67.1	66.0	44.7	53.5	70.9	40.1	55.5	67.7
Couldn't follow	1690	73.8	41.0	53.0	52.8	34.6	40.7	58.1	36.5	47.6	59.9
Difference			11.9***	14.1***	13.2***	10.2***	12.9***	12.8***	3.6***	7.9***	7.9***

			Average % score								
			MATHS			LANGUAGE			COGNITIVE		
Endline SRI competency	N	%	EGA 1 Age 6	EGA 2 Age7	EGA 3 Age 8	EGA 1 Age 6 (Language)	EGA 2 Age7 (Language)	EGA 3 Age 8 (Language)	EGA 1 Age 6 (Cognitive)	EGA 2 Age7 (Cognitive)	EGA 3 Age 8 (Cognitive)
Pattern Making											
Could do	1126	17.5	65.4	79.7	74.3	54.9	66.5	80.8	51.1	68.2	77.8
Couldn't do	1038	16.1	35.1	46.5	49.2	27.9	34.1	52.9	30.0	41.9	55.5
Difference			30.3***	33.2***	26.1***	26.9***	32.4***	27.8***	21.0***	26.3***	22.3***
Does not include the question on copying pattern which most of the children could do.											
Phonemic Awareness											
Could identify all sounds and pictures beginning with same sound	687	10.7	71.0	82.2	77.3	60.2	69.6	82.6	55.5	70.9	79.5
Couldn't identify all sounds or pictures with same beginning sounds	5757	89.3	47.3	61.2	60.8	39.9	47.8	65.7	37.2	51.4	64.1
Difference			23.7***	21.0***	16.5***	20.3***	21.8***	16.9***	18.3***	19.6***	15.5***
Sentence Formation											
Could describe in complete/incomplete sentences	4343	67.5	54.3	68.4	66.2	45.9	54.4	71.7	43.1	57.5	68.6
Couldn't describe in a sentence	2093	32.4	40.6	53.2	54.9	34.2	41.3	58.8	31.2	45.2	59.6
Difference			13.7***	15.2***	11.3***	11.7***	13.1***	12.9***	11.8***	12.3***	9.0***
Number Comparison											
Could do	1903	29.5	69.8	82.1	78.8	57.0	66.2	81.8	51.2	68.0	77.5
Couldn't do	4541	70.5	41.5	55.6	55.8	35.7	43.4	61.5	34.1	47.4	60.8
Difference			28.3***	26.5***	23.0***	21.6***	22.8***	20.3***	17.1***	20.6***	16.7***

** significant at p<0.05

CECED
Room No 307
Administrative Block
Ambedkar University Campus
Lothian Road
Delhi 110006

ASER Centre
B 4/54
Safdarjung Enclave
New Delhi 110029

United Nations Children's Fund
India Country Office
UNICEF House
73, Lodi Estate
New Delhi 110003

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